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INTRAORGANIZATIONAL RELATIONSHIPS BETWEEN WORK
TECHNOLOGY, STRUCTURE AND ORGANIZATIONAL
EFFECTIVENESS IN A COMMUNITY COLLEGE

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF EDUCATIONAL ADMINISTRATION

EDMONTON, ALBERTA

FALL, 1976

ABSTRACT

The purpose of the study was to explore the intraorganizational relationship between organizational effectiveness and the selected organizational characteristics of structure and work technology in a post-secondary institution. A review of related literature and research indicated that, within effective organizations, the technology was a good predictor of structure; furthermore, there was evidence that there were intraorganizational differences in the work technology, the structure and the effectiveness of larger organizations.

A conceptual framework of the relationships between and among technology, structure and effectiveness was constructed. A facet design approach was employed in examining the relationships between and among the various combinations of structural and technology variables. For the purposes of the study, it was assumed that organizational effectiveness would be higher for the combinations of independent variables—technology and structure—judged to be compatible on the basis of organizational theory and applied logic. The result was nine experimental hypotheses regarding the relationships between structural and technology variables when effectiveness was the dependent variable.

A questionnaire was used to collect perceptual data from all fulltime personnel engaged in the principal task or tasks of departments in Lethbridge Community College with a minimum of four fulltime staff members. The perceptual data related to the following variables: Exceptions and Search, the two technology variables; Formalization and Expertise, the two structural variables; and Productivity, Adaptability

and Overall Effectiveness, the three effectiveness variables.

The primary test of the nine experimental hypotheses was in relation to the twelve departments in the study. While only partial support was found for a number of the experimental hypotheses, several general trends were detected. Perceived effectiveness tended to be higher in departments when the emphasis on the structural variable, Formalization, was low. Perceived effectiveness tended to be higher in departments in which the number of Exceptional Cases Encountered, a technology variable, was high. In relation to the archetypal technologies, perceived effectiveness tended to be higher in departments with Routine and Nonroutine technologies when the structure was characterized by low Formalization and high Expertise.

The secondary test of the nine experimental hypotheses was in relation to individual respondent data. Using a two-way analysis of variance technique to test a series of research hypotheses, little support was obtained for the hypothesized interactions between pairs of independent variables. However, a number of significant main effects on the independent variables of Expertise and Exceptions were obtained when effectiveness was the dependent variable. Perceived effectiveness also tended to be higher when respondents perceived the emphasis on the structural variable, Expertise, to be high. Perceived effectiveness also tended to be higher when respondents perceived that the number of Exceptional Cases Encountered, a technology variable, was high as well. In relation to both Routine and Nonroutine technologies, respondents tended to perceive effectiveness to be higher when they perceived the structure of their departments to be low on Formalization and high on Expertise.

ACKNOWLEDGEMENTS

The writer wishes to acknowledge the assistance, support, encouragement and guidance received during the course of completing this study. He wishes to thank especially Dr. E. W. Ratsoy, his thesis advisor, for the time, advice and guidance provided during the study. When the goal of completion seemed farthest away, somehow Dr. Ratsoy managed to inject a little of his optimism that everything would work out in the end. Thanks are also extended to Dr. D. A. MacKay, Dr. E. Miklos, Dr. J. Small and Dr. J. B. Appleberry, the external examiner, for their advice and constructive criticism.

The writer wishes to thank Canada Council and Alberta Advanced Education and Manpower for the financial assistance received during the course of the study.

The writer wishes to acknowledge the special services provided by Mrs. C. Prokop, in assisting with the computer work, and Mrs. M. Voice, in typing the final manuscript; seldom does one find proficiency and charm in such abundance.

Finally, the writer wishes to acknowledge the special debt of gratitude owed his wife, Evelyn, who helped make the difficult times less trying and the successes more enjoyable. No one wished to see the study completed more.

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Chapter 1

INTRODUCTION

A major function of management in organizations is to assist the organization in becoming as effective as possible. While a number of organizations may exist for the same purpose and engage in similar activities, conventional wisdom suggests that some are more effective in their undertakings than are others. How might the differences between effective and less effective organizations be explained in terms of organizational theory?

THE PURPOSE OF THE STUDY

Post-secondary institutions, like all other kinds of organizations may strive to become highly effective but would appear to do so with varying degrees of success. By understanding the relationships between those organizational characteristics which are under the control of post-secondary institutions and organizational effectiveness, it should be possible to identify what a given institution might do in order to increase its potential for effectiveness in the future.

The purpose of the study is to explore the relationship between selected organizational characteristics and effectiveness in a post-secondary institutional setting in an attempt to clarify what relationships these selected characteristics might have to organizational effectiveness.

BACKGROUND TO THE STUDY

Organizational effectiveness is a concept which is both elusive and illusive. According to Lawless (1972:5), "True organizational effectiveness is . . . a bit like the Holy Grail—never quite reachable but always challenging." Theory and research in the area of organizational effectiveness have identified a number of factors which appear to have an effect upon the level of organizational effectiveness achieved but a number of these have been judged to be outside of the direct control of the organization. Insofar as there is probably little the organization can do about factors outside of its direct control, a more productive approach might be to concentrate attention upon those controllable organizational characteristics which appear to have an effect upon the level of organizational effectiveness achieved. By understanding the relationship between these controllable factors and effectiveness, it should be possible to manipulate them in order to increase the potential for organizational effectiveness in the future. Some leads as to the nature of such relationships can be drawn from an understanding of the nature of organizations themselves.

Organization is a product of man's realization that he, alone, is unable to fulfill all of his own needs. As a result, man joins with others in various cooperative endeavours in order to achieve certain goals or fulfill particular needs and aspirations. The resulting organizations become formal when, according to Schein (1970:9), they exhibit the following characteristics:

. . . the rational coordination of the activities of a number of people for the achievement of some common explicit purpose or goal, through division of labor and function, and through a

hierarchy of authority and responsibility.

Thus formal organizations are man-made tools for the planned, rational accomplishment of specified ends.

Although all formal organizations exhibit the characteristics of explicit purpose, division of labour and hierarchy of authority in some form, they do not all exist for the same purposes. Blau and Scott (1962) developed a classification system of formal organizations on the basis of their primary beneficiaries, as follows:

1. Mutual benefit—benefit members (clubs, associations, unions)
2. Business concerns—benefit owner-managers (stores, industries)
3. Service organizations—benefit clients (schools, hospitals)
4. Commonwealth organizations—benefit all (police, fire departments)

In order to survive, organizations must continue to be of value to their primary beneficiaries by meeting the needs of those who participate in organizational activities as well as those who subscribe to, or benefit from, the goods or services produced. According to Schein (1970:18):

To survive, the organization must continue to perform its primary task—the recruitment, proper utilization, motivation, and integration of the people in it.

For this reason, man has devoted a good deal of attention to the ways in which organizations function. A major product of this attention has been the development of a number of organizational theories.

While there are obvious differences in the specific perspectives of the various theories of organization, fundamental to all of them is the importance attached to the ways in which people are

organized and their activities are, or should be, structured and coordinated. In addition, as an organization grows and tends to become more complex, the organization of people and their activities appear to become a critical factor in determining, to some extent, how successful that organization will be in conducting its "planned transactions with the environment" (Lawrence and Lorsch, 1969:3). If the organizational structure is inappropriate, then the organization is not likely to be as successful or effective as it might otherwise be.

In attempting to identify appropriate structural patterns for a given organization, one must contend with two sometimes-conflicting constraints. First, the organization requires a control structure which is conducive to the efficient and effective coordination of the functionally-differentiated activities of organizational members. Secondly, the organizational structure must be sufficiently flexible so as to permit, if not encourage, the adaptability and innovativeness necessary in order for the organization to cope successfully with changing needs in changing times. To date, developments in the field of organizational theory tend to underscore the probability that there is no 'one best way' of structuring organizations. In addition, Hall's (1969:395-402) work on intraorganizational structural variations suggests that, because there are variations in intraorganizational structure in many complex organizations, identification of appropriate organizational structures should be based more upon the notion of important variations within, rather than a uniformity throughout, organizations.

One rather promising approach to the resolution of some of the problems involved in identifying appropriate organizational structures may be found in the theory and research relating to technology. In general terms, technology may be characterized as the nature of the work done in organizations. Although technology has been conceived of in somewhat different terms by such people as Trist (1951), Burns (1960), Woodward (1965), Lawrence and Lorsch (1967), Hickson, Pugh et al. (1969) and Perrow (1970), there would appear to be a basis for general agreement among these people that there are measurable differences in the work technology in various organizations and that different technologies require different structural arrangements. Furthermore, there would appear to be some evidence to suggest that, in effective organizations, the technology is a good predictor of structure. Woodward (1965), for example, found that, in the more successful manufacturing firms studied, those organizations with similar technologies were structured in a similar manner.

Magnusen (1972) went one step further. He discovered that different technologies can and do coexist within the same organization. For example, a given organization has a highly routinized and mechanized production process. At the same time, there is a research and development department in the same organization which engages in highly nonroutine work. Any assessment of the technology of the whole organization would tend to mask those internal differences.

If there are internal variations in the technology of a given organization, then it should follow that there are comparable variations in the internal structure of that organization as well.

In fact, insofar as there appears to be some kind of relationship between technology and structure, the overall effectiveness of the organization may depend to some extent upon there being different technology-structure matches within the organization in order to cope with variations in the nature of the work done by various component parts of the organization.

It was this line of reasoning which led to the formulation of the purpose for this study.

JUSTIFICATION FOR THE STUDY

There are two broad areas of justification for this study. First, there is a need for further research regarding organizational effectiveness, technology and the possible interrelationship between technology and structure especially in what Blau and Scott (1962) have termed, "service organizations." The second area of justification relates to the practical implications of the research findings to post-secondary institutions interested in increasing their potential for organizational effectiveness in the future. In short, this study appears justified on both theoretical and practical grounds.

Need for Further Research

Theory and research on the subject of organizational effectiveness tends to demonstrate a lack of consensus regarding (1) what organizational effectiveness is, (2) what the underlying dimensions of organizational effectiveness are, and (3) what relationships exist between organizational effectiveness and various organizational characteristics such as structure and the nature of the work done,

which shall be referred to as its technology. The work of such people as Georgopoulos and Tannenbaum (1957), Georgopoulos and Mann (1962), Etzioni (1965), Woodward (1965), Seashore and Yuchtman (1967), Price (1968), Mott (1972) and Steers (1975) offers some guidance as to what organizational effectiveness is and how it relates to various organizational characteristics. Much of the work done to date, however, has occurred in business or industrial settings but very little has been done in "service organizations."

Similarly, research in the area of technology has, to a major extent, been focused on business or industrial concerns where researchers have attempted to measure the technology of industrial processes. The closest any researchers have come to applying the technology perspective to educational institutions has been the work of such people as Derr and Gabarro (1972) who modified the Lawrence and Lorsch (1967) approach and Newberry (1971), Heron (1973) and Kelsey (1973) who modified the Aston Study approach.

As far as the interrelationship between technology and structure is concerned, the little work which has been done to date has occurred almost exclusively in business or industrial concerns as well. According to Blau and Scott (1962), "service organizations" such as educational institutions are different from mutual benefit, business or commonweal organizations; therefore, findings regarding organizational effectiveness in business and industrial settings may have only partial applicability to service organizations. If this is so, then the relationship between various organizational characteristics and organizational effectiveness may be different and warrant

further investigation.

The Effectiveness of Post-secondary Institutions

The second area of justification for this study relates to the likelihood that post-secondary institutions could become more effective than they are at present in coping with internal problems and adapting to changes in their environment. Although post-secondary institutions face problems over which they have little control, there are factors which appear to affect organizational effectiveness which are controllable. According to Likert (1967: 149-150), organizational characteristics such as structure, management style, management strategies, organizational objectives and the technologies employed are "causal variables" which Hersey and Blanchard (1972:96) defined as:

. . . those factors which influence the course of developments within an organization and its results or accomplishments. These variables are those independent variables that can be altered or changed by the organization and its management and not variables beyond the control of the organization.

This study explores the relationship between organizational effectiveness and the selected organizational characteristics of (1) structure and (2) technology, which is the nature of the work in a post-secondary institutional setting. On the basis of such an investigation, it is hoped that certain combinations of organizational characteristics can be identified which are associated with high levels of organizational effectiveness. Given this kind of information, a post-secondary institution might be able to pin-point what sorts of changes should be made to particular parts of its organizational

structure in order to improve the level of organizational effectiveness in the future.

RESEARCH PROBLEMS

The Problem

What is the relationship between organizational effectiveness and selected organizational characteristics of structure and technology in a post-secondary institution?

Sub-problems

In order to answer the question posed in the main problem, it was necessary to answer the following questions:

1. What is the relationship between organizational effectiveness and organizational structure?
2. What is the relationship between organizational effectiveness and the work technology?
3. What is the relationship between organizational structure and work technology?
4. What is the relationship between organizational effectiveness and the interaction between organizational structure and work technology?

DEFINITION OF TERMS

For the purposes of clarity and a common understanding, it is necessary to define the following terms as they are used in this study.

Technology—perceptions of respondents regarding the nature of the work they do in their respective departments in terms of (1) the

number of exceptional cases encountered and (2) the extent of the search behaviour required to handle the exceptional cases.

Exceptional Cases—the work demands, tasks or problems encountered which are somewhat unusual, out-of-the-ordinary or nonroutine in nature.

Search Behaviour—the extent of the search required in order to find solutions or procedures for handling the exceptional cases encountered in the job.

Craft Technology—the work technology characterized by (1) few exceptional cases encountered and (2) extensive search behaviour required to handle exceptional cases encountered.

Nonroutine Technology—the work technology characterized by (1) a high number of exceptional cases encountered and (2) an extensive search behaviour required.

Engineering Technology—the work technology characterized by (1) a high number of exceptional cases encountered and (2) minimal search behaviour required.

Routine Technology—the work technology characterized by (1) few exceptional cases encountered and (2) minimal search behaviour required.

Tasks—the things which one is required to do in the job.

Principal Tasks—the collectivity of tasks done by workers engaged in the work associated with the central purpose of the organizational subunit, as opposed to the job done by the support staff of that subunit.

Organizational Structure—perceptions of respondents regarding the extent to which their respective departments are bureaucratized.

Emphasis on Formalization—a dimension of structure based upon the aggregation of responses on the four bureaucratic characteristics of (1) hierarchy of authority, (2) rules for members, (3) procedural specificity, and (4) impersonality, which Kolesar (1967) referred to as Concentration on Authority.

Emphasis on Expertise—a dimension of structure based upon the aggregation of responses on the two bureaucratic characteristics of (1) specialization and (2) technical competence.

Organizational Effectiveness—perceptions of respondents regarding the (1) productivity and (2) adaptability of their respective departments.

Productivity—perceptions of respondents regarding the (1) quantity and (2) quality of the work done as well as the (3) efficiency with which the work is done in their respective departments.

Adaptability—perceptions of respondents regarding the extent to which people in their respective departments (1) are aware of new ideas and processes relating to the work they do, (2) adopt new ideas and processes in doing the work, (3) have developed suitable problem-solving strategies, and (4) are flexible in terms of being able to cope effectively with extra demands, work overloads or crash programs.

ASSUMPTIONS

This study is based upon the following assumptions:

1. The perceptions of respondents regarding the technology,

structure and organizational effectiveness of their departments were a valid means of measuring these variables.

2. The departmental level of a post-secondary institution was an appropriate organizational level at which to assess the technology of a post-secondary institution.
3. The measures of bureaucratic structure employed in this study were an appropriate means of describing the structure of departments in a post-secondary institution.
4. The particular organizational effectiveness variables selected for use in the study were an appropriate means of assessing organizational effectiveness in departments of a post-secondary institution.

DELIMITATIONS

The following are the delimitations of the study:

1. The study was delimited to one community college in Alberta.
2. The population of interest was delimited to all fulltime personnel engaged in the principal task or tasks of the fourteen departments in the selected community college which had a minimum of four fulltime members on staff.
3. Organizational structure was delimited to the departmental level.
4. Organizational effectiveness was delimited to the departmental level.
5. Technology was delimited to the work done by fulltime

staff members engaged in the principal task or tasks at the departmental level.

LIMITATIONS

The preceding assumptions and delimitations represented certain limitations to the study. Other limitations can be stated.

A major limitation of this study was its use of perceptions of respondents as a means of measuring technology, structure and organizational effectiveness. Perceptual data pose certain problems whenever they are used. First, perceptions are just that—they are not necessarily factual or objective in nature. Secondly, the perceptions of an individual are not necessarily an accurate reflection of the fact of his situation. His perceptions are based upon what he thinks the situation is for him and distortions are possible. The Thomas Theorem in sociology maintains that, "if people perceive something to be real, it will be real for them in terms of its consequences." Insofar as this may be the case, respondents' perceptions were assumed to be a valid means of measuring the technology, structure and organizational effectiveness of departments in the selected community college.

A second limitation of this study is the fact that it was delimited to one community college and therefore must be considered in many respects to be a case study. As a result, its findings must be viewed as exploratory within this limited context and could not be taken as a basis for generalization to other institutions in the system or to organizations in general.

A third limitation of this study arose from the previous one. By delimiting the study to one college in the system, the number of departments obtained was small. On the basis of such a small number of organizational units, it was not possible to test the hypotheses generated for use in the study as adequately as one might have preferred.

A final limitation to the study was the volume of literature and research available on the concepts of technology, structure and organizational effectiveness on the one hand, and the lack of consensus among the various writers on the other regarding the concepts themselves as well as the relationships between and among them. There appeared to be little agreement in the literature relating to technology, organizational structure and organizational effectiveness on how each was defined, how many dimensions or factors were involved, what the names of these factors might be or how best to measure them. This was especially true in the case of "service organizations" such as educational institutions. Much of the related literature dealt with technology, structure and effectiveness in general, or in relation to business or industrial concerns. Blau and Scott (1962) maintained that educational institutions were different from business concerns but there was little material in the related literature which could be used as a guide in deciding which of the many 'schools of thought' on technology, structure and effectiveness might be most appropriate for use in a study of an educational institution.

OUTLINE OF THE STUDY

This chapter outlines the main research problem and the sub-problems which were investigated and presents the justification for the study, the definitions of the terms used and the study's underlying assumptions, delimitations and limitations. The remainder of the dissertation is organized as follows:

Chapter 2—Review of Related Theory, Research and Literature.

Chapter 3—The Conceptual Framework, Facet Design and Experimental Hypotheses.

Chapter 4—Research Design, Instrument Selection and Development and Research Methodology.

Chapter 5—Description of the College and the Respondents.

Chapter 6—Research Findings in Relation to Departments.

Chapter 7—Research Findings in Relation to Individual Respondents.

Chapter 8—Summary, Conclusions, Implications and Suggestions for Further Study.

SUMMARY

While organizations may strive to become highly effective, they appear to do so with varying degrees of success. Research in the area of organizational effectiveness has tended to identify a number of factors which appear to affect the level of effectiveness achieved but many of these are outside of the direct control of the organization. As a result organizational efforts to increase effectiveness might be more productive if they were concentrated on those factors which are within the organization's direct control.

There was some evidence in the literature which suggested that within effective organizations the work technology was a good predictor of structure. On the basis of an assessment of the work technology, structure and effectiveness in a given organization, it might be possible to identify the characteristics of structure best suited to different technologies using effectiveness as the criterion variable. The resulting patterns of structure and technology might serve as guides to administrators interested in improving the level of effectiveness in their organizations.

The literature also suggested, however, that there can be multiple technologies as well as intraorganizational differences in structure within the same organization. Magnusen (1972) and Lynch (1973), for example, found that multiple technologies can exist within the same organization. Hall (1969) found that there can be important intraorganizational structural variations. It would follow that, within complex organizations, there are patterns of structure and technology which are associated with high effectiveness. If such patterns could be found, they could serve as guides to administrators interested in improving effectiveness within the complex organizations for which they are responsible.

This study had, as its main concern, the investigation of the relationship between organizational effectiveness and the selected organizational characteristics of technology and structure at the departmental level of a post-secondary institution in an attempt to clarify what relationships these selected characteristics might have to each other as well as to organizational effectiveness.

Underlying this study were a number of assumptions. It was assumed that perceptions of respondents on the work technology, structure and effectiveness were a valid means of measuring these variables. It was further assumed that departments were an appropriate organizational level at which to measure these variables.

The study was a case study delimited to one community college in Alberta. The study was further delimited to those fulltime members of departments engaged in the principal task or tasks of departments in which there was a minimum of four fulltime staff members. Measurement of technology, structure and effectiveness was delimited to the departmental level.

The major limitation of the study was its heavy dependence on perceptual data. The limitations posed by the exploratory nature of this case study were also acknowledged. The final limitation to the study was the lack of consensus in the literature regarding the technology, structure and organizational effectiveness and the relationships between and among them, especially in the service organization setting such as educational institutions.

Chapter 2

REVIEW OF RELATED LITERATURE AND THEORY

The presentation of related literature and theory is divided into four sections: (1) technology, (2) organizational structure, (3) organizational effectiveness, and (4) rationale for the intra-organizational assessment of technology, structure and effectiveness. Each section presents a brief summary of the current state of knowledge in the area.

TECHNOLOGY: AN OVERVIEW

The first organizational characteristic central to this study is technology. Although theorists and researchers such as Trist (1951), Woodward (1965), Lawrence and Lorsch (1967), Hickson et al. (1969) and Perrow (1970) have tended to define operationally technology in different ways and have tended to employ somewhat different methods in assessing it, there would appear to be a basis for general agreement that technology relates to the nature of the work done. Furthermore, there would appear to be some agreement that, in effective organizations, the technology is a good predictor of structure.

In order to present a brief summary of the current state of knowledge regarding technology, it was useful to synthesize what is known into what appeared to be five "schools of thought" on technology.

Socio-technical School

The first school of thought on technology might be called the

socio-technical school. The principal figures in the socio-technical school were Trist, Burns and Stalker as well as others who conducted their work at the Tavistock Institute.

Trist (1951) developed the socio-technical approach to study the effects of changes in technology in Northwest Durham coal mines. Essentially, Trist discovered that there was a need to view social and technological factors contingently if organizational effectiveness were to be maintained or achieved. Burns (1960) and Burns and Stalker (1961) developed the idea of "mechanistic" and "organismic" management systems in relation to the technologies and structures of electronics firms. Their approach demonstrated that it is not enough for a business or industrial organization just to meet the firm's technical and economic needs. If such arrangements fail to complement the needs of the workers, the organization's efficiency and effectiveness will be adversely affected as a result.

Production Process School

A second school of thought on technology might be called production process. The principal figure in the production process school was Woodward. If one takes Perrow's (1973:9) observation literally, Woodward (1965) founded the production process school of technology almost by accident. Woodward's research was initially concerned with testing a series of hypotheses based upon the classical principles of scientific management in industry. Her data were not supportive of her original hypotheses. In alternative analyses of her data, Woodward discovered similarities in the technological complexity of the industries studied which she identified as (1) small

batch, (2) mass production, and (3) continuous process. In the more effective organizations classified by production process employed, she discovered a strong relationship between the technology and the structure. Her work was instrumental in establishing a basis upon which diverse industrial organizations could be analysed.

Contingency School

A third school of thought on technology might be called the contingency school. The principal figures in this school of technology were Thompson, Lawrence and Lorsch. Lawrence and Lorsch (1967) approached technology from the point of view of the effect of the environment on the nature of the task and the structure which resulted. Drawing from the work of Woodward (1965), Thompson (1967) and Burns and Stalker (1961), Lawrence and Lorsch attempted to provide "a more comprehensive analytic framework for working on structural design problems" (Lorsch, 1970:5). They viewed organizations as "open systems capable of internal differentiation and developed a contingency model for studying the relationships between environment and internally differentiated complex structures" (Derr and Gabarro, 1972:27).

Unlike other theorists, Lawrence and Lorsch recognized that some subunits of an organization could be different from other subunits and developed a model which was based on two central concepts—differentiation and integration. They defined differentiation as "the difference in cognitive and emotional orientations among managers in different functional departments and differences in formal structure among these departments" and integration as "the quality of the state

of collaboration that exists among departments that are required to achieve unity of effort by the environment" (Lawrence and Lorsch, 1967:11). Perrow (1972:170) observed that Lawrence and Lorsch appeared to equate 'technology' with 'environment.' Thus, Lawrence and Lorsch contributed the idea of assessing intraorganizational technology to the further development of the concept.

Derr and Gabarro (1972) successfully applied Lawrence and Lorsch's theory to the Boston and Chilean school systems respectively and further supported the utility of the Lawrence and Lorsch approach to organizational analysis through assessment of organizational technology.

Work-flow School

A fourth school of thought on technology might be called the work-flow school. The principal figures in this school of technology were associated with the Aston Studies. The Aston Studies, under the direction of Hickson et al. (1969), appear to have been an outgrowth of the approach developed by Woodward in analysing production processes at the system level. The Aston Studies deserve consideration as a separate school of thought on technology in major part because of the work done at the University of Alberta by such people as Newberry (1971), Heron (1972) and Kelsey (1973). These University of Alberta researchers modified and adapted the Aston approach for use in various parts of the educational system. The major focus of the Aston school is on a detailed analysis of the nature and characteristics of the work-flow. A researcher using this approach to the assessment of technology conducts extensive interviews with senior management

personnel in a given organization, or group of organizations, in order to develop a detailed understanding of the nature of the work-flow in that organizational setting. In this way, the technology of an organization is ascertained.

Individual Task School

A final school of thought on technology might be called individual task. Perrow (1967; 1970) may be fairly regarded as the key figure in the individual task approach to the assessment of technology although the work of Hage and Aiken (1969) on an assessment of "overall routineness" contributed to this school of thought as well. Perrow's model for the assessment of technology was intended to overcome the industrial bias common to other approaches and, in doing so, permitted the comparison of technologies in diverse types of organizations at the same time.

Perrow's (1967:195) definition of technology reflects the somewhat generic nature of his approach to the concept. He defined technology as follows:

. . . the actions an individual performs on an object, with or without the aid of tools or mechanical devices, in order to make some change in the object. The object or 'raw material' may be a living being, human or otherwise, a symbol or an inanimate object.

Perrow (1967:196) maintained that the 'technology' of a job entailed two factors: (1) the number of exceptional cases encountered in the job and (2) the nature of the search behaviour employed by the individual when faced with a task. The concept of exceptional cases encountered involves the number of out-of-the-ordinary things which come up in the job as compared with the routine, everyday tasks. The

more routine the job, the fewer the exceptions encountered in all likelihood. The concept of "search behaviour" poses some problems, however. Perrow (1970:76) explained search behaviour in this way. The individual receives a stimulus—he is faced with a task which must be done—and he acts. He "searches" his mind for an appropriate way in which to handle the task; this Perrow termed "search behaviour." If the task is familiar and he has learned how to handle this sort of thing in the past, very little search behaviour is required to come up with a way to handle the task. If asked, the individual would probably be able to explain how he arrived at the solution in relatively simple terms. On the other hand, if the task turns out to be unfamiliar, then a much more extensive and difficult to analyse search behaviour occurs. The individual must "rely upon a residue of something we do not understand all that well—experience, judgement, knack, wisdom, intuition" (Perrow, 1970:76). This is what Perrow meant when he referred to unanalysable search.

Using these two dimensions of Exceptions and Search, Perrow constructed a matrix which is presented in Figure 1. Perrow labeled the technologies obtained in the four cells as (1) Craft, (2) Non-routine, (3) Engineering and (4) Routine.

Craft technology. Organizations with a craft technology would be similar to the craft guilds of the Middle Ages or some specialty businesses today. The majority of workers would be skilled craftsmen engaged in craft activities. The work would be characterized by relatively few exceptional cases encountered. These exceptional cases, when they did occur however, would necessitate a fairly extensive and

		NUMBER OF EXCEPTIONAL CASES	
		Few Exceptions	Many Exceptions
NATURE OF THE SEARCH BEHAVIOUR	Unanalysable Search	Craft	Nonroutine
	Analysable Search	Routine	Engineering

Figure 1. Perrow's Technology Construct

difficult to analyse search behaviour on the part of the individual.

Nonroutine technology. Organizations with a nonroutine technology would include such things as Research and Development units and Consulting firms. The majority of workers would be well educated individuals with particular talents and expertise which could be pooled to cope with larger tasks. The work would be characterized by many exceptional cases encountered. The exceptional cases would necessitate a fairly extensive and difficult to analyse search behaviour on the part of the individual.

Engineering technology. Organizations with an engineering technology would include such things as engineering firms and computing centres. The workers would be a mixture of well educated specialists and tradesmen or technicians. The work would be characterized by many exceptional cases encountered. Because procedures were already available for handling most of these exceptions should they occur, the exceptional cases would not require very extensive search behaviour on the part of the individual.

Routine technology. Organizations with a routine technology would include the majority of businesses and industries which utilize standardized production processes such as refineries, automobile manufacturer and insurance companies. The workers would probably have an average education and a command of the basic skills. The work would be characterized by few exceptional cases encountered. For the few exceptional cases which did come up, a relatively simple and easily analysed search behaviour would be required on the part of workers.

The work of Magnusen (1972) and Lynch (1973), using Perrow's construct, tended to support Perrow's theory of technology. Magnusen (1972) discovered that the fourteen medium-sized manufacturing firms he studied were primarily classifiable as having either routine or non-routine technologies and dropped both the craft and engineering technologies from further consideration. In examining his data, however, Magnusen (1973:25-26) observed that assessment of the technology of whole organizations tended to mask intraorganizational differences in the technology of subunits such as production departments and research and development departments, for example. Magnusen (1973:25) criticized the Perrow construct on the basis that it overlooked the possibility of multiple technologies within the same organization.

Lynch (1973) took this criticism of Perrow's construct and demonstrated that it could be employed in such a way so as to provide for the possibility of multiple technologies within the same organization. Lynch (1974:346-348), in her study of five functionally differentiated departments in academic libraries, found that departments with similar functions tended to cluster together on the basis of their technology. Although perhaps only implicitly, Lynch would appear to have demonstrated the applicability of Perrow's theory of technology to the assessment of multiple technologies in the same organization.

After a detailed examination of each of the approaches to technology described in this chapter, it was decided that the one developed by Perrow was appropriate for use in this study. First of all, it was the most generic in nature of all of the approaches because it dealt with two factors at the individual level. Secondly,

of all of the approaches, this one appeared to be the most easily operationalized and administered. Thirdly, the work of Lynch (1973) had demonstrated that Perrow's approach to technology could be used at the departmental level.

Having settled on a means of measuring the technology in a post-secondary institution, the next task was finding an approach to measuring and describing organizational structure which would be appropriate in this study.

ORGANIZATIONAL STRUCTURE

The second organizational characteristic central to this study is organizational structure. However conceived and described, a concern for the structure of organizations would appear to be fundamental to virtually all theories of organization. As Hall (1972:105-106) noted:

Structure is a fact in any organization and is the point from which analyses of most facets of organizational life must begin. While it is possible to study goals without much concern for structure, it would be fruitless to examine effectiveness without considering the various structural arrangements that might be related to different forms of effectiveness.

Before examining the various schools of thought on the subject of organizational structure, it would be useful to look at some of the problems of definition which emerge from the literature regarding structure.

Problems of Definition

There are, perhaps, as many definitions of structure as there are people who are concerned with it. For example, Kast and Rosenzweig (1970:170) defined organizational structure as ". . . the established pattern of relationships among the components or parts of the organization." March and Simon (1958:190), working from a

behavioural perspective, defined structure as follows:

. . . consisting simply of those aspects of the pattern of behavior in the organization that are relatively stable and that change more slowly.

From a systems perspective, Miller (1965:209) defined organizational structure as, ". . . the arrangements of its subsystems and components in three-dimensional space at a given moment in time." Allport (1962:3), using a social systems approach, defined organizational structure as a process which involves:

. . . the structuring of events or happenings rather than physical parts and [the organization] has no structure apart from its functioning.

Katz and Kahn (1966:31), in attempting to make Allport's idea of structure a little easier to conceptualize, defined organizational structure as, ". . . the buildings, the technological equipment, and the people they contain."

While all of these definitions of structure suggest certain things in common, Thompson's (1967:51) definition appeared to be both generic in nature and appropriate to almost every context. He defined structure as, ". . . the internal differentiation and patterning of relationships." Even after a definition of structure is adopted, however, the difficulties associated with deciding among alternative schools of thought on the subject and identifying the underlying dimensions of structure for research purposes still remain.

Dimensions of Organizational Structure

According to social systems theorists such as Katz and Kahn (1966:30-70), for example, organizational structure and function are inseparable concepts. On the horizontal work-flow dimension, structure is viewed as being made up of five subsystems: (1) production

or technical, (2) production support, (3) maintenance, (4) adaptive, and (5) managerial. On the vertical dimension, systems theorists speak of the hierarchical arrangements which relate, in part, to the managerial subsystem but "not completely overlapping it" (Katz and Kahn, 1966:83). This dimension is associated with such things as the allocation and distribution of power, prestige and privilege. Analysis of organizational structure from the systems perspective is a complex and difficult task.

The structure of organizations from a bureaucratic perspective appeared to be a more traditional and rational approach. Based on the characteristics of bureaucratic structure identified by Weber (1947), numerous researchers and theorists have explored organizational structure from this perspective. The result, as underscored by Ratsoy (1974), has been a plethora of claims as to the actual number and names applied to the underlying structural dimensions identified.

Hall (1961), in summarizing the work of a number of researchers such as Merton (1940), Udy (1959), Parsons (1959) among others, concluded that there were six underlying dimensions to bureaucratic structure which could be labelled (1) hierarchy of authority, (2) division of labor, (3) behavioral rules, (4) a system of procedures, (5) impersonality, and (6) emphasis on competence. MacKay (1964), using Hall's work as his starting point, found that these six dimensions of organizational structure were present in schools. MacKay (1964:76) discovered, however, that there was an inverse relationship between emphasis on technical competence and the first five dimensions which he attributed to the existence of professional

staff members in such organizations. Kolesar (1967), using MacKay's work as his starting point, identified the six dimensions of bureaucratic structure as (1) hierarchy of authority, (2) rules for members, (3) procedural specificity, (4) impersonality, (5) specialization, and (6) emphasis on technical competence. On the basis of a factor analysis of his data, Kolesar discovered that these six variables could be reduced to two dimensions: (1) concentration on authority, which incorporated the first four variables, and (2) emphasis on expertise, which incorporated specialization and emphasis on technical competence. Subsequent research by such people as Anderson (1968) and Punch (1970) further corroborated the idea of two underlying dimensions of bureaucratic structure.

Other researchers and theorists in the area of organizational structure have come to slightly different conclusions regarding the number and names of structural dimensions. Hickson et al. (1969), for example, maintained that there were six dimensions to organizational structure: (1) specialization, (2) formalization, (3) standardization, (4) centralization, (5) configuration, and (6) flexibility. Inkson et al. (1970) claimed to have reduced these six dimensions to two which they termed (1) structuring of activities, and (2) concentration on authority.

Hage and Aiken (1966) suggested that organizational structure had three dimensions: (1) centralization, (2) formalization, and (3) complexity. Applying Hage and Aiken's work to an educational setting, Bishop and George (1973) found evidence to support the three dimensions of structure identified by Hage and Aiken but maintained

that a fourth dimension, which they termed professional latitude or autonomy, was also present.

Lorsch (1970:1) maintained that a distinction should be drawn between what he termed "basic structure" and "operating mechanisms" which are used to "implement and reinforce this basic structure." According to Lorsch, "basic structure" incorporates such things as division of labour, specialization of both task and function, reporting relationships and so on. "Operating mechanisms" include such things as rules governing members' activities, control and work procedures, spatial arrangements and the reward-compensation system. Kast and Rosenzweig (1970:171-172) offered a similar classification system for distinguishing among elements involved in the structure of organizations.

Perrow (1970:81) described four dimensions of organizational structure which he called (1) discretion of individuals, (2) distribution of power, (3) nature of in-group coordination, and (4) nature of intergroup interdependence.

Hall (1972:108), after examining a large number of research studies relating to organizational structure, concluded that there were three dimensions to structure under which everything else could be grouped: (1) size, (2) complexity, and (3) formalization. As Hall (1972:108) noted, however: "Any choice made under these circumstances [describing or measuring organizational structure] is somewhat arbitrary."

For the purposes of this study, it was decided that the bureaucratic approach to structure similar to the one developed by

MacKay (1964) and used by Kolesar (1967) was appropriate. First of all, the college in which the study was conducted was organized along bureaucratic lines according to its senior administrators and a bureaucratic approach to measuring and describing its structure therefore seemed appropriate. Secondly, according to Kolesar (1967), bureaucratic structure was factor-analysable down to two factors which made the conceptualizing in this study simpler. Thirdly, an easily administered instrument which had already been shown to be both valid and reliable was readily available for use in the study. For these reasons, a bureaucratic approach to measuring and describing organizational structure was adopted for use in this study.

Having adopted approaches to measuring and describing technology and structure in a post-secondary institution, the next task was finding some suitable means of measuring and describing organizational effectiveness.

ORGANIZATIONAL EFFECTIVENESS

The final organizational concept central to this study is organizational effectiveness. Organizational effectiveness is an umbrella concept which probably cannot be dealt with in a simple fashion. A survey of related literature has tended to suggest that, while most writers on the subject agree that organizational effectiveness is something important and worth the attention paid to it, they appear to disagree on what factors are involved and how they should be measured. First of all, although used interchangeably by some, efficiency and effectiveness are not synonymous. Efficiency relates

to outputs achieved from inputs made: something would be judged highly efficient if maximum outputs were achieved from minimum inputs. Effectiveness is different from efficiency because, while organizations may be highly efficient, it does not follow that they are necessarily effective. Secondly, as Argyris (1964:115-145) noted, people and groups of people in organizations tend to develop their own notions of what is 'effective' and are prone to sticking to their belief that they are right in spite of events and evidence to the contrary. In this same vein, different parts of a given organization may subscribe to different notions of effectiveness and come into conflict with one another as a result. Thirdly, because various researchers and theorists have approached the concept of organizational effectiveness from slightly different perspectives, they have tended to define, describe and measure it differently. Hall (1972:96-103), in an attempt to synthesize the work done to date on organizational effectiveness, concluded that there were three, basic schools of thought on the subject: (1) goal approach, (2) system-resource approach, and (3) the multiple criteria approach.

The Goal Approach

Organizational effectiveness based on the goal approach could be defined as "the degree to which [an organization] realizes its goals" (Etzioni, 1964:8) although the weakness in this approach, as Etzioni (1964:16) went on to note, is a potentially critical one:

Since goals, as symbolic units, are ideals which are more attractive than the reality which the organization attains, the organization can almost always be reported to be a failure.

In the same vein, Seashore and Yuchtman (1967:378), concerned with

the inadequacies of the goal approach to measuring organizational effectiveness, stated, "the goals of organizations are numerous and are often conflicting with one another and changing in priority over time." This observation has been further substantiated by such people as Perrow (1961), Price (1968; 1972) and Mahoney and Weitzel (1969) among others.

As a result of this concern, Price (1968), in a detailed summary of fifty research studies which related to the concept of organizational effectiveness, focused on the 'operative goals' of organizations rather than the 'formal' or 'official' goals. Price (1968:4-6) reasoned that the operative goals more closely reflected what organizations and their leaders were actually doing. On the basis of his summary of fifty studies in this area, Price concluded that the primary indicators of effectiveness were the operative goals of (1) productivity, (2) morale, (3) conformity, (4) adaptiveness, and (5) institutionalization. Of these, productivity appeared to account for the major proportion of most effectiveness measures.

Mott (1972) developed a method of assessing organizational effectiveness in general hospitals which used the operative goals approach. Mott (1972:17) defined organizational effectiveness as, ". . . the ability of an organization to mobilize its centers of power for action—production and adaptation." He went on to observe that (1972:17):

Effective organizations are those that produce more and higher-quality outputs and adapt more effectively to the environmental and internal problems than do other, similar organizations.

Approaching organizational effectiveness from this perspective,

Mott (1972:20-24) identified two criterion dimensions of organizational effectiveness which he termed (1) productivity and (2) adaptability. On the basis of his data analyses, Mott concluded that flexibility was a related but somewhat different subdimension of adaptability. As Price (1968) before him, Mott (1972:201-204) discovered that productivity accounted for the major proportion of his measure of organizational effectiveness.

Hall (1972:98) suggested a caveat regarding the validity of productivity measures as a basis for assessing organizational effectiveness:

. . . the use of productivity as the major indicator . . . is misleading and/or inapplicable in service organizations and less than perfect in many production organizations.

Hall offered no support for this contention but the point should be considered, perhaps, when approaching the question of organizational effectiveness from this direction.

The System-resources Approach

Seashore and Yuchtman (1967) were instrumental in the development of the system-resources approach to measuring organizational effectiveness. Based upon a systems approach, Yuchtman and Seashore (1967:898) defined organizational effectiveness as follows:

. . . the ability of an organization, in either relative or absolute terms, to exploit its environment in the acquisition of scarce and valued resources to sustain its own functioning.

From this perspective, an organization would be judged effective if it "maximizes its bargaining position and optimizes its resource procurement" (Hall, 1972:99). Zwerman (1970:186), in supporting the system-resources approach to measuring organizational effectiveness,

added two qualifiers: (1) bearing in mind the given, existing constraints on the organization from its environment, and (2) optimization short of destroying the future viability of the organization in its given environment.

Seashore and Yuchtman (1967) maintained that criteria for effectiveness from this perspective, or indicators of it, should be selected situation-specific factors which relate to a given organization and the larger system, or environment, in which it is found. While some of the criteria Seashore and Yuchtman identified could be viewed as operative goals of organizations, a number of them appeared to be more like environmental resources which an organization seeks and attempts to secure from its environment in its efforts to become effective. In their study of insurance sales agencies, for example, Seashore and Yuchtman (1967:383) selected the following kinds of situation-specific indicators of effectiveness: (1) business volume, (2) new member productivity, (3) production costs, (4) youthfulness of members, (5) management emphasis, and (6) market penetration to cite six of the ten used.

It is important to note that the system-resource approach to measuring organizational effectiveness is situation-specific in nature which means that the effectiveness indicators used are probably only applicable to the given organization under study and, therefore, not likely to lead to any meaningful generalizations about organizational effectiveness in other organizations.

The Multiple Criteria Approach

The multiple criteria approach to organizational effectiveness appeared to be an extension and incorporation of the previous two schools of thought on this subject. As Hall (1972:99-100) noted:

. . . there is no universal standard by which effectiveness can be judged, making effectiveness an issue which would have to be handled organization by organization, or at least type of organization by type of organization.

The work of Mahoney (1967) and Mahoney and Weitzel (1969) suggested that a multiple criteria approach was therefore necessary. Starting with 114 characteristics which had been related to organizational effectiveness at one time or another, Mahoney and Weitzel discovered that, although there appeared to be twenty-four, relatively independent criterion dimensions, the effectiveness criteria did not vary together. In fact, attempts to increase effectiveness in one area stood a good chance of adversely affecting it in another. Argyris (1964:115) observed that, while both productivity and morale might be viewed as indicators of effectiveness, pressure by management to increase productivity might well result in a decrease in morale, for example.

In their study, Mahoney and Weitzel (1969:359) concluded that the productivity-support-utilization dimension accounted for something over fifty percent of the variance which is a finding similar to that of both Price (1968) and Mott (1972).

Although Coleman (1972) was concerned with a slightly different order of things, his approach to organizational effectiveness appeared to be based essentially upon a multiple criteria approach as well. Coleman was interested in organizational effectiveness in schools and sought indicators of effectiveness in an organizational context in

which the majority of workers were professionals. Coleman (1972:51) suggested that the following criteria could be viewed as indicators of effectiveness in such organizations: (1) clarity and omnipresence of objectives, (2) involvement in open discussions of policies and issues, (3) frequent discussion of progress and achievement, (4) participation in goals and policy setting activities, and (5) delegation of authority and responsibility as appropriate.

Likert (1967:47-77) proposed that criteria for organizational effectiveness could be viewed as falling into three categories: (1) causal, (2) intervening, and (3) output variables. Causal variables, according to Hersey and Blanchard (1972:96-97), are "those factors which influence the course of development within an organization" and are "variables that can be changed." Examples of causal variables include such things as management style, organizational structure, organizational objectives and technology. Intervening variables, according to Likert (1967:140) are variables which represent the current internal state in an organization and may be viewed as falling into two subcategories: (1) attitudinal, motivational and perceptual clusters, and (2) behavioural clusters. Output variables are reflective of the end result or achievement of an organization and involve such things as production, costs, turnover, absenteeism, morale and so on.

By evaluating these factors, Likert suggested that one would be able to ascertain the current level of effectiveness and identify focal points for future efforts in increasing the overall effectiveness of a given organization. Because causal variables represent a

class of things over which the organization has direct control, it is easy to understand why most organizations tend to concentrate attention upon making changes in such things as management style, organizational structure, clarifying and adjusting objectives and so on.

For the purposes of this study, it was decided that the approach to measuring organizational effectiveness developed by Mott (1972) was appropriate. First of all, the vast majority of the work summarized in this chapter had been conducted in business or industrial settings. Mott was one of the very few who had attempted to assess organizational effectiveness in a "service organization." Insofar as educational institutions are service organizations, it was decided that Mott's approach to assessing organizational effectiveness would be suitable. Secondly, many of the approaches developed by others involved too great a degree of situation-specificity to be used in this study without extensive modification and pilot testing. The Mott instrument, on the other hand, had been field tested in several different settings and found to be both valid and reliable. Only slight modifications were required for use in this study. Finally, Mott's work seemed close enough to the centre of much of the work that has been done in the area of organizational effectiveness that it was decided his approach would be suitable for use in an exploratory study such as this.

Having selected a means of measuring and describing technology, organizational structure and organizational effectiveness, the only thing which remained was to justify the assessment of these variables at the intraorganizational, or departmental, level.

RATIONALE FOR THE INTRAORGANIZATIONAL ASSESSMENT
OF TECHNOLOGY, STRUCTURE AND EFFECTIVENESS

Conventional wisdom suggests that complex organizations are made up of subunits or departments which are different from one another in some way. Evidence found in the literature on organizations tends to support the notion of intraorganizational differences. Hall (1972: 140-171) examined the concept of organizational complexity in relationship to the kinds of differentiation commonly found within complex organizations. Thompson (1967:25-65) underscored the importance of understanding how departmentalization and unit independence were factors which posed potential problems for organizations in terms of subunit interdependence and coordination. Magnusen (1972) found there were differences in technology within organizations, as well as within certain departments. Lynch (1973) discovered differences in the nature of the work done among functional departments of academic libraries. Perrow (1973:12), in reference to internal differences in the nature of the work done in organizations, stated: "We also know that this distinction is important in organizing different parts of the organization." Lawrence and Lorsch (1967) demonstrated that subsystem differentiation was a fact of most complex organizations and, in their view, an important factor in developing an accurate understanding of effective organizational design and structure.

While the reason for the subdivision of organizations into departments may be attributable to the notion of 'simple administrative convenience,' a more logical explanation for such subdivision would be that it is the product of recognized functional differences

within the total task-load of the organization. As a result, groups of similar or related tasks are assigned to a particular group of workers. This group of workers is then referred to as a department and operates under a departmental title which is drawn from the nature of the tasks involved such as Finance, Planning and Research, Sales, Maintenance and so on. In theory, then, there would appear to be differences in the work done by different departments.

A post-secondary institution such as a college or university is a complex organization made up of a number of functionally-differentiated departments which, hopefully, contribute to the achievement of the overall goals of the institution. Knowledge of the nature of the differences which exist among various departments within a post-secondary institution would appear to be useful in developing a detailed understanding of the nature of such organizations. One approach to identifying and understanding differences among departments of a post-secondary institution would entail the intraorganizational assessment of three variables: (1) technology, (2) structure, and (3) effectiveness.

Rationale for the Intraorganization Assessment of Technology

The work of Lawrence and Lorsch (1967), Magnusen (1972) and Lynch (1973), for example, has tended to demonstrate that there are intraorganizational differences in technology. All of these researchers arrived at what appeared to be a common conclusion: to overlook intraorganizational difference in technology is tantamount to ignoring an important variable in the nature of that organization.

As Mott (1972:5) observed, subunits of complex organizations tend to differ in the extent to which they are "open" or "closed" because of differences in the principal task or tasks of each subunit. Some departments, for example, may engage in relatively routine, or routinized, tasks which are based upon known inputs from predictable sources. The tendency would be to handle such tasks in fairly predictable, established and routine ways. Other departments in the same organization, however, may engage in relatively nonroutine tasks which are based upon fairly unpredictable inputs from a wide variety of sources. Such departments would tend to handle these tasks in a more nonroutine or situationally-contingent manner. If such intraorganizational differences do exist in post-secondary institutions, for example, there would appear to be a need to assess the nature of these differences in an attempt to develop a detailed understanding of how the institution operates.

Rationale for the Intraorganizational Assessment of Structure

Hall (1969:401-402), in investigating intraorganizational structural variations from the bureaucratic perspective, concluded that important variations in bureaucratic structure did exist within complex organizations. His findings led him to conclude that an understanding of intraorganizational structural variations would help in explaining some of the differences in the effects which structural arrangements appeared to have upon other organizational phenomena.

Perrow (1972:166) went further along this line when he suggested that the nature of the work done, or the technology, should

be used as a guide to determining suitable structural arrangements. It would follow that, if there were differences in the technology of various departments of a post-secondary institution, there should be comparable differences in the structural arrangements of those same departments.

Thus, there would appear to be a logical basis upon which to assess the intraorganizational structure of complex organizations such as post-secondary institutions.

Rationale for the Intraorganizational Assessment of Organizational Effectiveness

Just as whole organizations tend to differ in the level of organizational effectiveness achieved, so it would follow that subunits of whole organizations may differ as well. Writers such as Argyris (1964), Thompson (1967) and Lawrence and Lorsch (1967), for example, have tended to demonstrate that subunits of complex organizations can be different from one another in a number of respects. Some departments of larger organizations may tend to become almost 'organizations' in their own right and function as if they were somehow separate. While one may challenge the appropriateness or desirability of such a thing, especially in terms of the effect this might have upon the organization as a whole, people such as Argyris (1964:115) have noted that different parts of larger organizations may, indeed, begin to operate as if they were independent of other parts of the organization.

On this basis, it would seem probable that subunits of complex organizations would likely differ with respect to the levels

of organizational effectiveness achieved (Mott, 1972). Such differences may be related to the tasks involved as some tasks are easier to accomplish than others. Some differences may be associated with the particular mix of personnel involved. Still other differences may be associated with the appropriateness, or inappropriateness, of the structure, the managerial styles employed, and so on.

Thus, by using a measure of organizational effectiveness as a criterion variable, it should be possible to compare departments of a complex organization and identify patterns of characteristics which appear to be associated with high levels of organizational effectiveness at the intraorganizational level.

SUMMARY

This chapter presented a brief summary of the literature, theory and research relating to technology, organizational structure and organizational effectiveness, the three organizational characteristics central to this study. In addition, this chapter presented a rationale for the intraorganizational assessment of each of these organizational characteristics at the departmental level of a post-secondary institution.

Evidence was found in the literature, theory and research to support the notion that, within effective organizations, the technology was a good predictor of structure. In addition, however, there was a good deal of evidence in the work of people such as Thompson (1967), Hall (1969), Magnusen (1972) and Mott (1972) to support the idea that there were intraorganizational differences in

the technology, structure and effectiveness of larger organizations. As a result, it appeared reasonable that an exploration of the relationships between these organizational characteristics could be conducted at the intraorganizational, or department level.

This study set out to explore the relationship between organizational effectiveness and the selected organizational characteristics of technology and structure at the departmental level of a post-secondary institution.

Chapter 3

CONCEPTUAL FRAMEWORK AND FACET DESIGN

This chapter presents the conceptual framework and facet design for this study. The conceptual framework identifies the possible relationships between the work technology, organizational structure and organizational effectiveness variables. The facet design was used to identify possible relationships between these variables which led to the formulation of hypotheses for this study.

CONCEPTUAL FRAMEWORK

Although there would appear to be a number of possible relationships between and among the various combinations of organizational effectiveness, technology and structure, it would be misleading to suggest that these relationships are simple or direct. While organizational structure appears to have both direct and indirect effects upon organizational effectiveness, for example, it does not necessarily follow that this relationship is one of cause and effect. As Hall (1972:177) noted after an extensive review of research studies on the subject of organizational structure:

While none of the studies that were discussed attributed causal primacy to structural factors, it is clear from the analysis that structural characteristics have an important relationship with other major organizational features

Thus, it would appear that overall organizational effectiveness would likely be affected by structural patterns employed.

One of the "other major organizational features" referred to

by Hall (1972:177) is technology. The relationship between structure and technology may be a little clearer although further verifications of Perrow's contentions, among others, are required. Perrow (1970: 166) contended that:

When the tasks people perform are well understood, predictable, routine, and repetitive, a bureaucratic structure is most efficient. Where the tasks are not well understood, generally because the "raw material" that each person works on is poorly understood and possibly reactive, recalcitrant, or self-activating, the tasks are nonroutine. Such units or organizations are difficult to bureaucratize.

Thus, it would appear that the technology might be used as a predictor of suitable structural arrangements for both whole organizations and their subunits.

Assuming that there is a relationship between technology and structure, it would follow that the level of organizational effectiveness may be affected by the suitability of the technology-structure match. This line of reasoning led to the development of the schematic representation of possible relationships and interrelationships between and among organizational effectiveness, technology and structure as depicted in Figure 2.

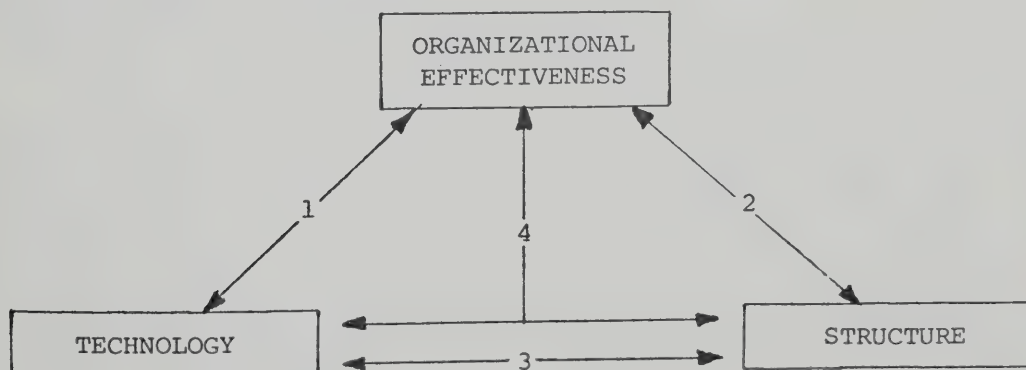


Figure 2. Conceptual Framework of Possible Relationships between and among Organizational Effectiveness, Technology and Structure

1. Effectiveness and Technology

There was no evidence in the literature to suggest that there is a relationship between organizational effectiveness and technology. The only possible relationship between these two factors might be that the more routine technologies may experience slightly higher levels of organizational effectiveness because of the straight-forwardness of the tasks involved although no firm evidence was found to support such a contention.

2. Effectiveness and Structure

As Hall (1972:177) noted, there is no evidence to suggest that there is a direct or causal relationship between structure and effectiveness. When structure is viewed from the bureaucratic perspective however, there would appear to be some support in the work of such people as MacKay (1964), Kolesar (1967), Anderson (1968) and Punch (1970) for the idea that organizational effectiveness may be higher when the concentration on authority and the emphasis on expertise vary inversely.

3. Structure and Technology

The work of such people as Woodward (1967), Lawrence and Lorsch (1967), Hage and Aiken (1969) and Perrow (1970), among others, suggested that technology and structure are related in some ways. Using Perrow's construct of technology, it would appear that the more extensive the search behaviour required, the higher the emphasis on expertise and the lower the concentration on authority should be. Similarly, the greater the frequency of exceptional cases encountered,

the higher the emphasis on expertise and the lower the concentration on authority should be.

4. Effectiveness, Structure and Technology

By taking the possibility of paired relationships further, it is theoretically possible that there is a relationship between organizational effectiveness and the interaction between technology and structure. On the basis of Perrow's construct, it would appear that organizational effectiveness will be higher when the structural characteristics of organizations, or their subunits, are compatible with the technology of that unit.

FACET DESIGN

In searching for some means of identifying and predicting the nature of possible relationships between organizational effectiveness, technology and structure, a facet design approach was selected. According to Runkel and McGrath (1972:17):

Facet design is a way of laying out a domain for research. Although it systematizes the generation of hypotheses, its special power resides in the fact that it enables one to specify the boundaries and structure of the entire domain of relevance within which one may wish to experiment.

The "domain of relevance" in this study involved work technology, organizational structure and organizational effectiveness. Two structural variables were identified for use in this study; concentration on authority and emphasis on expertise. Two technology variables were identified for use in this study; the number of exceptional cases encountered in the job and the extent of the search behaviour required to handle the exceptional cases encountered. At

this point in the study, organizational effectiveness was considered as a single variable.

The facet design approach permits the examination of various combinations of research variables in order to make judgements, on the basis of organizational theory and applied logic, whether such combinations would be compatible or incompatible. For the purposes of this study, it was assumed that organizational effectiveness would be higher when the combination of variables was judged compatible.

Two facet designs were used in the study. The first facet design, which is presented in Figure 3, dealt with the relationship between two levels of the two structural variables—concentration on authority and emphasis on expertise. The second facet design, which is presented in Figure 4, dealt with the relationships between two levels of the two structural variables and two levels of the two technology variables—number of exceptional cases encountered and the extent of the search behaviour required to handle the exceptional cases encountered. A variation on a facet design, which is presented in Figure 5, dealt with the structural characteristics which were thought to be compatible with each of the four archetypal technologies described by Perrow (1970).

Relationship between the Structural Variables

Figure 3 represents a facet design for examining the relationship between two levels of the two structural variables of concentration on authority and emphasis on expertise. On the basis of organizational theory and applied logic, it appeared that these two structural

variables would be more compatible when they tended to vary inversely;

		Concentration on Authority	
		High	Low
Emphasis on Expertise	High	Low Effectiveness	High Effectiveness
	Low	High Effectiveness	Low Effectiveness

Figure 3. Facet Design of Relationship between Two Structural Variables which Predicts the Level of Organizational Effectiveness Associated with each Combination on the Basis of their Theoretical Compatability

that is, high Authority with low Expertise and low Authority with high Expertise. For the purposes of this study, it was assumed that organizational effectiveness would be higher when the combination of variables was judged to be compatible. On the basis of the facet design presented in Figure 3, it was possible to generate the first experimental hypothesis in this study.

Experimental hypothesis 1. Experimental hypothesis 1 deals with the relationship between Authority and Expertise when Effectiveness is the dependent variable.

Organizational effectiveness will be higher when the emphasis on Authority and Expertise vary inversely.

Relationship between Structural and Technology Variables

Figure 4 presents a facet design for examining the relationships between two levels of the two structural and two technology variables in this study. As was the case in the previous section

TECHNOLOGY

		EXCEPTIONAL CASES		SEARCH BEHAVIOUR	
		Many Exceptions	Few Exceptions	Extensive Search	Minimal Search
CONCENTRATION ON AUTHORITY	High	Low Effectiveness	High Effectiveness	Low Effectiveness	High Effectiveness
	Low	High Effectiveness	Low Effectiveness	High Effectiveness	Low Effectiveness
EMPHASIS ON EXPERTISE	High	High Effectiveness	Low Effectiveness	High Effectiveness	Low Effectiveness
	Low	Low Effectiveness	High Effectiveness	Low Effectiveness	High Effectiveness

STRUCTURE

Figure 4. Facet Design of Relationships between Two Structural and Two Technology Variables which Predicts the Level of Organizational Effectiveness Associated with each Combination on the Basis of their Theoretical Compatability

dealing with structural variables, judgements regarding the compatibility of the various combinations of structural and technology variables were made on the basis of organizational theory and applied logic. For the purposes of this study, it was assumed that organizational effectiveness would be higher when the combination of structural and technology variables were judged to be compatible.

On the basis of the facet design presented in Figure 4, it was possible to generate a series of four experimental hypotheses regarding the relationship between structural and technology variables.

Experimental hypothesis 2. Experimental hypothesis 2 deals with the relationship between Authority and Exceptions when Effectiveness is the dependent variable.

Organizational effectiveness will be higher when the emphasis on Authority and the number of Exceptional Cases Encountered vary inversely.

Experimental hypothesis 3. Experimental hypothesis 3 deals with the relationship between Authority and Search when Effectiveness is the dependent variable.

Organizational effectiveness will be higher when the emphasis on Authority and the extent of Search Behaviour Required vary inversely.

Experimental hypothesis 4. Experimental hypothesis 4 deals with the relationship between Expertise and Exceptions when Effectiveness is the dependent variable.

Organizational effectiveness will be higher when the emphasis on Expertise and the number of Exceptional Cases Encountered vary directly.

Experimental hypothesis 5. Experimental hypothesis 5 deals with the relationship between Expertise and Search when Effectiveness

is the dependent variable.

Organizational effectiveness will be higher when the emphasis on Expertise and the extent of Search Behaviour Required vary directly.

Compatible Structural Patterns for the Four Archetypal Technologies

Combining Perrow's (1970) technology construct and the facet design represented in Figure 4, it would be possible to predict the structural characteristics theoretically suited to each of the four types of technology. Figure 5 outlines the structural characteristics which would be theoretically associated with high levels of organizational effectiveness for each of the four types of technology: Craft, Nonroutine, Engineering and Routine.

There appeared to be no problems in identifying the structural characteristics which would be associated with high organizational effectiveness for both Routine and Nonroutine technologies on the basis of the facet design presented in Figure 4. For Routine technologies, high organizational effectiveness would seem to be associated with high Authority and low Expertise. For Nonroutine technologies, high organizational effectiveness would be associated with low Authority and high Expertise. Problems arose in the cases of Craft and Engineering technologies.

One of the characteristics of a Craft technology is "few exceptional cases encountered." According to the facet design presented in Figure 4, higher organizational effectiveness would be associated with high Authority and low Expertise. When the second characteristic of a Craft technology—extensive search behaviour

CRAFT TECHNOLOGY		NONROUTINE TECHNOLOGY	
<u>Characteristics of Craft Technology</u> 1. Few exceptional cases 2. Extensive search behaviour required <u>Predicted Structural Characteristics on the Basis of High Effectiveness</u> Authority High Low Expertise Low High		<u>Characteristics of Nonroutine Technology</u> 1. Many exceptional cases 2. Extensive search behaviour required <u>Predicted Structural Characteristics on the Basis of High Effectiveness</u> Authority Low High Expertise High Low	
ROUTINE TECHNOLOGY		ENGINEERING TECHNOLOGY	
<u>Characteristics of Routine Technology</u> 1. Few exceptional cases 2. Minimal search behaviour required <u>Predicted Structural Characteristics on the Basis of High Effectiveness</u> Authority High High Expertise Low Low		<u>Characteristics of Engineering Technology</u> 1. Many exceptional cases 2. Minimal search behaviour required <u>Predicted Structural Characteristics on the Basis of High Effectiveness</u> Authority Low High Expertise High Low	

Figure 5. Predicting Structural Characteristics Associated with High Organizational Effectiveness for Each of the Four Types of Technology

required—was examined, the structural characteristics associated with higher organizational effectiveness were found to be just the reverse. The same problem arose in relationship to Engineering technology. Given this apparent contradiction, it was necessary to go back to the work of Perrow (1970) and Magnusen (1973) for some guidance.

After a careful re-examination of Perrow's (1970) work, the problem still remained. First, Perrow described the structural patterns appropriate for each of the four archetypal technologies in terms of discretion, power, coordination and interdependence rather than in bureaucratic terms. Secondly, Perrow described differentiated structural patterns for middle and lower management in whole organizations with archetypal technologies.

Some guidance was provided by a synthesis of Perrow's theorizing prepared by Magnusen (1973:23) and presented in Figure 6. On this basis, it was possible to make certain assumptions regarding the bureaucratic structural pattern likely to be associated with higher organizational effectiveness in the cases of Craft and Engineering technologies. First of all, Magnusen identified Craft organizations as being decentralized while Engineering organizations were classified as being centralized. Secondly, discretion and power were described as being higher at the bottom of Craft organizations than at the top while just the reverse was the case with Engineering organizations. As a result of these observations, it was decided that higher organizational effectiveness would be associated with low Authority and high Expertise in Craft technologies while higher

CRAFT ORGANIZATIONS				NONROUTINE ORGANIZATIONS					
TASK STRUCTURE									
<u>Discretion</u>		<u>Power</u>	<u>Coord. w/in Groups</u>	<u>Group Inter-dependence</u>	<u>Discretion</u>		<u>Power</u>	<u>Coord. w/in Groups</u>	<u>Group Inter-dependence</u>
MM*	Low	Low	Plan.	Low	High	High	Feed.	High	
LM**	High	High	Feed.		High	High	Feed.		
(Decentralized)					(Decentralized)				
SOCIAL STRUCTURE									
Social Identity: Based on Friendship				Goal Identity: Based on a Sense of Mission					
GOALS									
<u>System</u>		<u>Product</u>	<u>Derived</u>	<u>System</u>		<u>Product</u>	<u>Derived</u>		
Stability		Quality	Conservative	High Growth		High Quality	Liberal		
Low Risk		No Innovations		High Risk		Innovative			
Moderate Profit Emphasis				Low Profit Emphasis					

TASK STRUCTURE									
<u>Discretion</u>		<u>Power</u>	<u>Coord. w/in Groups</u>	<u>Group Inter-dependence</u>	<u>Discretion</u>		<u>Power</u>	<u>Coord. w/in Groups</u>	<u>Group Inter-dependence</u>
MM**	Low	High	Plan.	Low	High	High	Feed.	Low	
LM**	Low	Low	Plan.		Low	Low	Plan.		
(Centralized)					(Centralized)				
SOCIAL STRUCTURE									
Instrumental Identity: Based on Pay, Job Security Protection from Arbitrary Authority				Task Identity: Based on Technical Satisfactions					
GOALS									
<u>System</u>		<u>Product</u>	<u>Derived</u>	<u>System</u>		<u>Product</u>	<u>Derived</u>		
Stability		Quantity	Conservative	Moderate Growth		Quantity	Liberal		
Low Risk		No Innovations		Moderate Risk		Moderate Innovations			
High Profit Emphasis				Moderate Profit Emphasis					

ROUTINE ORGANIZATIONS				ENGINEERING ORGANIZATIONS			
• Middle Management							
•• Lower Management							

* Middle Management
 ** Lower Management

Figure 6. Summary of Perrow's Theory of Technology in Relation to Other Organizational Characteristics (Magnusen, 1973:23)

organizational effectiveness would be associated with high Authority and low Expertise in Engineering organizations. These conclusions became working assumptions in this study but would require further verification through research before they could be offered as anything more than working assumptions.

On these bases, four experimental hypotheses were generated regarding the structural characteristics which would be associated with higher organizational effectiveness in each of the archetypal technologies.

Experimental hypothesis 6. Experimental hypothesis 6 deals with the structural characteristics judged to be compatible with a Craft technology.

In a Craft technology, organizational effectiveness will be higher when Authority is low and Expertise is high.

Experimental hypothesis 7. Experimental hypothesis 7 deals with the structural characteristics judged to be compatible with a Nonroutine technology.

In a Nonroutine technology, organizational effectiveness will be higher when Authority is low and Expertise is high.

Experimental hypothesis 8. Experimental hypothesis 8 deals with the structural characteristics judged to be compatible with an Engineering technology.

In an Engineering technology, organizational effectiveness will be higher when Authority is high and Expertise is low.

Experimental hypothesis 9. Experimental hypothesis 9 deals with the structural characteristics judged to be compatible with a Routine technology.

In a Routine technology, organizational effectiveness will be higher when Authority is high and Expertise is low.

Special Note

Factor analyses of structural inventory data led to a reconsideration of the appropriateness of the Concentration on Authority factor label. As discussed in Chapter 4, a more appropriate factor label appeared to be Emphasis on Formalization. Insofar as this change did not appear to violate either the theory upon which the facet designs were based, or the experimental hypotheses generated, the factor label was changed in each hypothesis in which it was a variable.

SUMMARY

The conceptual framework for this study involved the possible relationships and interrelationships between and among organizational effectiveness, structure and technology. Although there was no evidence to suggest a relationship between effectiveness and technology, there was sufficient support in the literature to theorize that there might be predictable relationships between (1) effectiveness and structure, (2) structure and technology, and (3) between effectiveness and the interaction between structure and technology.

A facet design approach was used to demark the research domain for this study and to generate hypotheses for testing. Facet designs, based on two dimensions of bureaucratic structure as suggested by Kolesar (1967)—concentration on authority and emphasis on expertise—and two dimensions of technology as perceived by Perrow (1970)—the

number of exceptional cases encountered and the extent of the search behaviour required to handle the exceptional cases encountered—it was possible to predict the level of organizational effectiveness which would theoretically occur in each of the cells of the facet designs. As a result, nine experimental hypotheses were generated for testing in this study.

In keeping with the results of the factor analyses of structural inventory data reported in Chapter 4, the concentration on authority factor label was changed to emphasis on formalization as this factor label was deemed more appropriate in this study. Insofar as this change did not appear to violate either the theory upon which the facet design was based or the experimental hypotheses generated, the factor label was changed in each hypothesis in which it was a variable under study.

Chapter 4

RESEARCH DESIGN AND METHODOLOGY

This chapter is divided into three sections: (1) research design, (2) instrument selection and development, and (3) research methodology.

RESEARCH DESIGN

The Purpose of the Study

The purpose of the study was to explore the relationship between selected organizational characteristics and organizational effectiveness in a post-secondary institution in an attempt to clarify what relationships these selected characteristics might have to organizational effectiveness.

The Focus of the Study

The particular focus of the study was on the selected organizational characteristics of structure and technology at the departmental or intraorganizational level of a community college. The structure and technology variables were selected because they represented a class of organizational variables over which most organizations have some direct control. The intraorganizational level of the college was selected because there appeared to be merit in exploring the nature and extent of differences within a given organization as opposed to differences among whole organizations as has been more normally the focus of organizational studies in the past.

Research Variables

For the purposes of the study, technology and structure were identified as the independent variables while organizational effectiveness was classified as the dependent variable.

Technology variables. Based on Perrow's (1967:196) construct of technology, there are two primary technology variables in this study: the number of exceptional cases encountered (Exceptions) and the nature and extent of the search behaviour required to handle the exceptional cases (Search).

Structural variables. Drawing from the perspectives of bureaucratic structure and based on the work of MacKay (1964) and Kolesar (1967), there are two primary structural variables in this study: the emphasis on formalization (Formalization) and the emphasis on expertise (Expertise).

Effectiveness variables. Based on the work of Mott (1972), there are three primary effectiveness variables in this study: Productivity, Adaptability and Overall Effectiveness.

Respondents

The respondents in the study were all fulltime staff members engaged in the principal task or tasks of the fourteen departments in Lethbridge Community College with a minimum of four fulltime members of staff.

Insofar as there was no reason to believe that the technologies of departments in one community college would be substantially

different from the technologies of similar departments in other colleges in the system, the departments in this study were viewed as possibly representative of the system.

Research Hypotheses

Using the facet design approach outlined in the previous chapter, nine experimental hypotheses were generated. In order to test these hypothesized relationships between and among variables, it was necessary to create three research hypotheses stated in the null form for each of the nine experimental hypotheses.

The first research hypothesis in each case addressed the absence of a significant interaction between Factor A, the first variable mentioned, and Factor B, the second variable mentioned in the experimental hypothesis, when effectiveness is the dependent variable. The second and third research hypotheses dealt with the absence of a significant main effect on either Factor A or Factor B when effectiveness is the dependent variable. Insofar as the pattern was repeated in the case of each of the nine experimental hypotheses, an example of research hypotheses relating to Experimental Hypothesis 1 was deemed adequate to clarify the specific nature of the research hypotheses employed in this study.

Experimental hypothesis 1. This experimental hypothesis dealt with the relationship between Formalization and Expertise when effectiveness is the dependent variable.

Research hypothesis 1.1. Research hypothesis 1.1 maintained that there would be no significant interaction between Factors A and B, Formalization and Expertise, when effectiveness is the dependent

variable.

There is no significant interaction between Emphasis on Formalization and Emphasis on Expertise when effectiveness is the dependent variable.

Research hypothesis 1.2. Research hypothesis 1.2 states that there would be no significant main effect on Factor A, Formalization, when effectiveness is the dependent variable.

There is no significant main effect on Emphasis on Formalization when effectiveness is the dependent variable.

Research hypothesis 1.3. Research hypothesis 1.3 maintained that there would be no significant main effect on Factor B, Expertise, when effectiveness is the dependent variable.

There is no significant main effect on Emphasis on Expertise when effectiveness is the dependent variable.

As previously mentioned, this pattern for research hypotheses was repeated for each of the nine experimental hypotheses to permit the testing of the hypothesized relationships between and among the technology, structural and effectiveness variables.

INSTRUMENT SELECTION AND DEVELOPMENT

Three instruments were required for this study in order to measure respondents' perceptions of organizational effectiveness, structure and technology at the departmental level. A search of available instrumentation revealed that suitable, previously validated means of measuring organizational effectiveness and bureaucratic structure were already developed. In the case of the technology instrument, however, a pilot study of a pool of items had to be conducted before an instrument suitable for use in this study could be

developed.

Effectiveness Instrument

Mott (1972) had developed an instrument for measuring perceptions of organizational effectiveness at the departmental level in service organization settings and this appeared suitable for use in this study. As a result of his application of this instrument in a test-retest of twelve divisions in the Office of Administration at the National Aeronautics and Space Administration (NASA) as well as in a state mental hospital, Mott (1972:199) was able to conclude that the instrument was both a "valid and inexpensive measure" of organizational effectiveness. On the basis of a test-retest of this instrument at NASA conducted approximately a year and a half apart, a reliability coefficient of .68 was obtained which suggested that the instrument was reasonably reliable as well (Mott, 1972:194).

Several minor changes were required in order to make the instrument appropriate for use in this study. First, as Mott (1972:35) had suggested, two items which addressed the "symbolic adaptability of the organization" were created as substitutes for the item relating to how well members kept abreast of new tools and methods suitable for use in their work. Second, an item requesting an estimate of overall effectiveness was added. Finally, items were reworded so as to ask respondents for their perceptions of organizational effectiveness in relationship to their respective departments in the college.

Structural Instrument

For the purposes of this study, structure was conceived of in bureaucratic terms. As a result, the instrument developed by MacKay (1964) and used by Kolesar (1967) was selected as suitable for this study. Use of this instrument by MacKay (1964), Kolesar (1967), Anderson (1968), and Punch (1970) tended to demonstrate its validity and reliability. However, the present study appeared to be the first time this instrument had been used at the intraorganizational level or in a post-secondary institution. As a result, items were reworded as necessary so they related to the departmental context of a community college.

Technology Instrument

Magnusen (1972) and Lynch (1973) had both developed items intended to measure Perrow's (1967) technology construct. Some problems regarding the face and content validity of these items arose, however, when they were submitted to a group of graduate students for reaction. In most cases, items were questioned because they appeared to involve double barreled statements. As a result, it was decided that a pool of items should be generated and a pilot study conducted with a view to identifying a group of more suitable and defensible items for use in the study.

Twenty-four items were generated on the following bases: eleven items relating to the Exceptions dimension, eleven items relating to the Search dimension and two items which were intended to assess the overall routineness of the work. It was hypothesized that the last two items would load on both factors as a result of a

two-factor factor analysis. Each item was in the form of a statement about different aspects of work to which respondents were requested to circle the most appropriate of five response categories from Strongly Agree to Strongly Disagree. A copy of the instrument is contained in Appendix A.

A research sample composed of the respondents described in Table 1 was drawn from the Department of Educational Administration at the University of Alberta and the Alberta Department of Advanced Education and Manpower.

TABLE 1

The Research Sample for Pilot Study on Technology Instrument
N = 40

Respondents		Number
Academic staff members		10
Doctoral students		10
Managers in government department		10
Clerical staff		
(a) Government department	5	10
(b) University department	5	

Completed questionnaires were received from all respondents.

A factor analysis (Appendix B) of the pilot study data revealed that fourteen of the original twenty-four items demonstrated a factor loading of .400 or better on one or the other of the two factors involved. These fourteen items split evenly with seven on each of the Exceptions and Search factors. As hypothesized, the two items relating to overall routineness loaded on both factors suggesting

that the two factors measured something other than routineness of the technology alone.

One-way analysis of variance tests were run on the data collected on the fourteen items identified in the factor analysis using four respondent groups: professors, doctoral students, managers and clerical staff. Significant differences were obtained at the .05 level between mean scores of clerical staff and mean scores of the three other groups on three of the seven Exceptions items. In every case, clerical staff perceived fewer exceptional cases encountered than did the other groups. Significant differences were obtained at the .05 level between the mean scores of clerical staff and the mean scores of the other groups on five of the seven Search items. In every case, the clerical staff perceived less extensive search behaviour required of them in handling exceptional cases encountered than did the other groups. In addition, a significant difference between the mean scores of managers and professors was obtained at the .05 level on two of the seven Search items. In both cases, the managers perceived more extensive search behaviour required to handle exceptional cases encountered than did the professors.

An overall significant difference between the mean score of clerical staff and those of both managers and professors was obtained at the .05 level on the Exceptions variable. Similarly, an overall significant difference was obtained at the .05 level between clerical staff and all three other groups on the basis of mean scores on the Search variable. In each case, the clerical staff perceived fewer exceptional cases encountered and less extensive search behaviour

required in comparison to others.

As a result of these findings, a technology instrument was constructed for use in the study.

VALIDATION OF THE INSTRUMENTATION

The face and content validity of the instruments used in this study had been reasonably established on the basis of previous applications of the instruments in other studies or the reactions of a group of graduate students. In order to check the construct validity of each instrument, a factor analysis technique was employed as a means of investigating whether or not items loaded on the factors as designed. On the basis of what was discovered, instrument subscales were refined for use in the study.

In addition, a correlation coefficient matrix was constructed for seven demographic and seven research variables as a means of examining the relationships between them. A correlation coefficient of .20 or better was taken as significant for a group of ninety-seven respondents (Ferguson, 1971:457).

Construct Validity of the Technology Instrument

On the basis of the results of the pilot study, a technology instrument which was composed of a total of fourteen items was employed in this study. When a factor analysis was performed (Appendix E), two factors emerged. Thirteen of the fourteen original items loaded at the .516 level or better on one or the other of the two factors. Item 13 was dropped from further consideration as it loaded about

equally on both factors. Items 1, 3, 5, 6, 11 and 12 loaded together and were labelled Exceptions. Items 2, 4, 6, 13 and 14 loaded together and were labelled Search. Only one item—item 9—loaded differently from what had been discovered as a result of the pilot study. Item 9—My job requires me to cope with a series of problems, one after the other—was originally designed as an Exceptions item but loaded on Search. Insofar as respondents may have responded to this item from the perspective of the search behaviour required of them when they encounter problems, it was decided that this item could be considered as a part of the Search subscale.

On the basis of the factor analysis it was concluded that the technology instrument represented a reasonable degree of construct validity for use in this study.

Construct Validity of the Structural Instrument

As previously indicated in Chapter 3, the structural instrument adopted for use in this study was a slight modification of an instrument developed by MacKay (1964) and used by Kolesar (1967) for measuring bureaucratic structure. Working on the assumption of a two-factor solution which Kolesar had proposed, a factor analysis of data arising from this instrument was performed. The results of that factor analysis have been included in Appendix F. While interpretation of the Eigenvalues suggested a two factor solution, the results of the factor analysis suggested that this instrument was not factorially pure. Of the thirty items supposedly related to Concentration on Authority, only fourteen resulted in a factor loading of

.400 or better.

In addition, four Authority and three Expertise items loaded negatively at the .400 level on the opposite factor from the one to which they were supposedly related according to Kolesar. After a detailed examination of the results of this factor analysis, no explanation for these findings could be given.

When subscale correlation coefficients were calculated for the six bureaucratic subscales used by MacKay (1964), support was found for MacKay's (1964:75-76) findings that the Technical Competence subscale correlated negatively with the Hierarchy of Authority, Rules for Members, Procedural Specificity, Impersonality and Specialization subscales. The results of this investigation are presented in Table 2.

TABLE 2

Correlation Coefficient Matrix for Six Subscales
in the Bureaucratic Structural Inventory

	Hier- archy	Rules for Members	Proced. Specif.	Imper- sonality	Special- ization	Tech. Comp.
Hierarchy	-	.529	.193	.438	.482	-.201
Rules		-	.486	.337	.559	-.400
Proc. Spec.			-	.376	.537	-.225
Impers.				-	.585	-.190
Spec.					-	-.247

Each of the correlations between Technical Competence and the other five subscales was found to be significant at the .05 level.

As a result of these findings, a second factor analysis was

performed on the data using only those items which had demonstrated a .400 factor loading on the first factor analysis. The results of the second factor analysis are also contained in Appendix F. In this case, the percentage of total variance accounted for rose to 43.5% as opposed to only 32.3% on the first factor analysis and all twenty-one items loaded at .450 or better on the factor to which they were conceptually related.

For the purposes of this study, items 4, 8, 9, 12, 14, 17, 18, 23, 25, 29, 31, 35, 39 and 43 were combined to form the Authority subscale while items 3, 11, 20, 30, 34, 40 and 44 were combined to form the Expertise subscale. In examining the items relating to each factor, it became apparent that the Concentration of Authority factor label used by Kolesar was possibly inappropriate. As a result this factor was relabelled Emphasis on Formalization. Insofar as this did not appear to violate the intent of the facet design or the experimental hypotheses generated from it, it was decided that the experimental hypotheses were still applicable after appropriate changes were made to the structural variable originally labelled Concentration on Authority.

On the basis of these findings, it was concluded that the items included in the Formalization and Expertise subscales represented a reasonable degree of construct validity for use in this study.

Construct Validity of the Effectiveness Instrument

A factor analysis was performed on the organizational effectiveness instrument used in this study and the results are contained

in Appendix G. A two-factor solution was suggested by the Eigenvalues and tended to be supported when nine of the ten items used loaded on one or the other of the two factors at the .616 level or better. The tenth item was intended as an estimate of overall effectiveness and, as expected, tended to load evenly on both factors. As a result, items 1, 2 and 3 were combined to form the Productivity subscale while items 4, 5, 6, 7, 8 and 9 were combined to form the Adaptability subscale.

Originally, it had been intended to create a measure of Overall Effectiveness by establishing a mean score for each respondent on the basis of all nine items used in construction of the Productivity and Adaptability subscales. This plan was abandoned after a detailed examination of the correlation matrix relating to all ten items used in the effectiveness instrument. Item 10, the estimate of overall effectiveness, correlated at .49 or better with every one of the other nine items. As the measure of Overall Effectiveness had been intended as a means of arriving at one good, single measure of effectiveness, it was decided that the tenth item in the instrument would be used for this purpose.

On the basis of these findings, it was decided that the organizational effectiveness instrument represented a sufficiently high degree of construct validity for use in the study.

Correlation Matrix of Relationships between Demographic and Research Variables

Table 3 presents a correlation coefficient matrix relating to seven demographic and seven research variables. For a group of

TABLE 3

Correlation Matrix of Fourteen Demographic and Research Variables

	Age	Educ. level	Educ. Cert.	Vrs. in job	Vrs. in this college	Vrs. doing similar work	Vrs. of total work experience	Exceptions	Search	Formalization	Expertise	Productivity	Adaptability
Educational level	-.13												
Educational certification	.00	.91											
Years in present job	.50	-.17	-.05										
Years in this college	.50	-.12	.01	.89									
Years doing similar work	.56	-.18	-.13	.55	.59								
Total years work experience	.78	-.10	-.01	.53	.59	.64							
Exceptions	-.05	.38	.40	-.01	.06	-.09	.03						
Search	.13	.50	.52	-.06	.08	.03	.15	.45					
Formalization	.24	-.45	-.36	.14	.14	.24	.11	-.35	.46				
Expertise	.13	-.18	-.14	.21	.16	.18	.22	.15	.00	.04			
Productivity	-.13	.10	.06	-.12	-.15	-.03	-.06	.28	.09	-.11	.24		
Adaptability	-.10	-.07	-.09	-.03	-.04	-.19	.02	.39	.04	-.17	.18	.61	
Overall Effectiveness	-.17	-.01	.01	-.03	-.04	-.10	.06	.31	.04	-.14	.23	.66	.71

ninety-seven respondents, a coefficient of .20 or better was necessary for the correlation coefficient to be significant at the .05 level (Ferguson, 1971:457). On the basis of what is presented in Table 3, it was possible to examine the nature of relationships between variables in this study.

Age. Age was found to correlate significantly with four other demographic variables: (1) years in present job, (2) years worked in the college, (3) years spent doing similar work, and (4) total work experience since leaving high school. In each case, age, not surprisingly, correlated positively with the work experience variables which meant that the older the respondent was, the more years of experience he or she had accumulated. The only significant correlation between age and the research variables was obtained in the case of Formalization. The positive correlation meant that the older a respondent was, the more Formalization he or she perceived.

Educational level. Educational level was found to correlate significantly with only one other demographic variable and this occurred in the case of educational certification. The finding meant that the higher the educational level achieved, the higher the educational certification attained. Educational level correlated significantly with three of the research variables as well. In the cases of both Exceptions and Search, the positive correlation suggested that the higher the educational level achieved, the higher the Exceptions encountered and the more extensive the Search required in the work situation. Educational level correlated significantly but negatively

with Formalization. This finding suggested that the higher the educational level achieved, the lower the perceived emphasis on Formalization.

Years in present job. Years in present job was found to correlate significantly with four of the seven demographic variables: (1) age, (2) years in the college, (3) years doing similar work, and (4) total work experience. In each case, the more years in the present job, the more years accumulated on the other variables. Years in present job correlated significantly with only one of the research variables and this occurred in the case of Expertise. This finding meant that the more years in the present job, the higher the perceived emphasis on Expertise.

Years in the college. Years in the college was found to correlate significantly with age and the other three work experience variables. In each case, the more years worked in the college, the more years accumulated on the other variables. There was no significant correlation obtained between years in the college and any of the research variables.

Years doing similar work. Years doing similar work was found to correlate significantly with age and the other three experience variables. In each case, the more years doing similar work, the more years accumulated on the other experience variables.

Total work experience. Total work experience was found to correlate significantly with age and the other three experience

variables. In addition, total work experience was found to correlate significantly with Expertise. This finding suggested that the more years worked, the greater the perceived emphasis on Expertise.

Exceptions. The Exceptions variable was found to correlate significantly with Search which meant that the higher the number of Exceptions perceived, the more extensive the Search perceived. Exceptions correlated significantly but negatively with Formalization which meant that the higher the number of Exceptions, the lower the perceived emphasis on Formalization. Exceptions was also found to correlate significantly with all three effectiveness variables. This finding suggested that the more Exceptions perceived, the higher the perceptions of Productivity, Adaptability and Overall Effectiveness.

Search. Search was found to correlate significantly with Exceptions as noted in the previous section but not with any of the other research variables.

Formalization. Formalization did not correlate significantly with any of the other research variables.

Expertise. Expertise was found to correlate significantly with both Productivity and Overall Effectiveness. This finding suggested that the higher the perceived emphasis on Expertise, the higher the perceptions of Productivity and Overall Effectiveness.

Productivity. Productivity was found to correlate significantly with both Adaptability and Overall Effectiveness. In both

cases, this finding suggested that the higher the perceived Productivity, the higher the perceived Adaptability and Overall Effectiveness.

Overall Effectiveness. Overall Effectiveness was found to correlate significantly with Adaptability which meant that the higher the perceived Adaptability, the higher the perceived Overall Effectiveness.

Sex. In order to determine whether or not there were significant differences between males and females on any of the demographic or research variables, a t-Test was used. The results are presented in Table 4.

Significant differences were obtained between males and females on six of the seven demographic variables. Males were found to be older than females, tended to hold higher educational certification and had accumulated more years of work experience on each of the four work experience variables than the female respondents.

Only one significant difference was obtained between males and females on the seven research variables and this was in the case of Productivity. Females perceived higher Productivity than did male respondents.

Discussion. On the basis of the correlation matrix, it appeared that the research variables were relatively independent from the demographic variables. As a result, it was decided that the relationships between and among the research variables could be tested without having to control for the effects of demographic variables.

TABLE 4

Results of t -Test on Demographic and Research Variables
 Using Male and Female Data Groupings
 N = 96

Variable	Male X Score	Female X Score	t	Probability (Two-tail)
Age	5.78	4.34	3.33	.01
Educational level	2.42	2.12	1.69	NS
Educational certification	2.98	2.24	3.11	.01
Years in present job	5.29	3.08	4.53	.001
Years in the college	5.71	3.53	4.25	.001
Years doing similar work	5.96	5.00	2.23	.01
Total of work experience	7.75	6.34	4.14	.001
Exceptions	3.84	3.72	0.78	NS
Search	2.87	2.67	1.26	NS
Formalization	3.27	3.33	-0.53	NS
Expertise	2.01	2.26	-1.41	NS
Productivity	4.01	4.28	-2.76	.01
Adaptability	3.81	3.94	-1.28	NS
Overall Effectiveness	4.02	4.12	-0.72	NS

RESEARCH METHODOLOGY

Permission to Conduct Research

Permission to conduct the research at Lethbridge Community College was secured through contacts with the President. The President convened a meeting of his senior administrators at which time the researcher presented the proposal and received approval to conduct the study. It was agreed that the study would be conducted at no direct cost to the college and with no subsequent obligations on the part of anyone involved. Upon satisfactory completion of the final oral, the researcher promised that a copy of the dissertation would be forwarded to the college for information.

Data Collection

Data collection occurred during the third week of November. As a result of direct contacts with senior administrators and department chairmen, copies of the covering letter and four-part questionnaire (Appendix C) were distributed to all full-time staff members of every department in the college. In a number of cases, college administrative officials assisted by distributing the questionnaire and encouraging staff members to participate in the study.

Additional data were collected as a result of interviews conducted with all senior administrators as well as various staff members in non-administrative capacities. The original interview schedule was disrupted, however, when the President of the College was dismissed by the Board on Wednesday of the data collection week. As a result, a number of planned interviews had to be cancelled and

some difficulties were encountered in conducting the remainder as planned.

The majority of completed questionnaires were returned directly during the data collection week. The remainder of the completed questionnaires were returned via courier service as the postal strike prevented direct mailing.

On Thursday morning of the data collection week, a letter expressing appreciation for support in the study and encouraging respondents to complete and return outstanding questionnaires was distributed throughout the college (Appendix D). In addition, a number of senior administrators contacted people in their respective divisions and departments and encouraged them to return questionnaires if they had not already done so.

Data Treatment

Data from completed questionnaires were coded on computer cards for analysis. Responses to the personal and demographic variables were coded in relationship to a system designed for this purpose. Responses to the technology instrument were coded as follows: "1" for response which represented either few exceptions or minimal search on up to "5" for either many exceptions or extensive search. Responses to the structural instrument were coded as follows: "1" for highly nonbureaucratic responses on up to "5" for highly bureaucratic responses. Responses to the organizational effectiveness instrument were coded as follows: "1" for responses indicating low perceived effectiveness on up to "5" for indications of high perceived effectiveness.

Frequencies and distribution of responses. The first data treatment involved the determination of frequencies and percentage distributions of responses on all items in the questionnaire using the Division of Educational Research Service's (DERS) NONP4 program.

Testing the experimental hypotheses using departments. In order to test the nine experimental hypotheses in relation to departments as the unit of organization, departments were grouped on the basis of high and low mean scores on the pair of independent variables identified in each hypothesis in a manner similar to that described in Figure 7 in this chapter. Because the number of departments involved was small, no statistical procedure was employed in comparing mean effectiveness scores in each of the four cells. As a result, actual differences in mean effectiveness scores were examined and compared and the structural characteristics found to be associated with the highest and lowest mean effectiveness scores were identified in relation to each of the experimental hypotheses for which there was sufficient data.

Testing the research hypotheses using two-way analysis of variance. Insofar as the number of departments involved in the study did not permit more precise testing of the experimental hypotheses, it was decided to examine the experimental hypotheses in relationship to the patterns perceived by individual respondents in their respective departments. A two-way analysis of variance technique was employed using the DERS program, ANOV25. Two-way analysis of variance permits the investigation of potential interactive relationships among

variables as well as the presence of main effects on the part of one or more of the variables under study. For the purposes of this study, a significant interaction between variables was considered as evidence for the possible rejection of null research hypotheses relating to the absence of a significant interaction between pairs of variables. The presence of significant main effects was taken as grounds for the possible rejection of null research hypotheses relating to the absence of such main effects on either of the independent variables identified.

Respondent groups. In testing the research hypotheses derived from the first four experimental hypotheses, all respondents were used. Using the procedure described in Figure 7, respondents were divided into four approximately equal groups. Two-way analysis of tests were then performed in order to ascertain whether or not there were any significant interactions or main effects on the basis of any of the three effectiveness variables.

		Factor 'B'	
		High	Low
Factor 'A'	High	High means scores on both Factor 'A' and Factor 'B'	High mean scores on Factor 'A' but low mean scores on Factor 'B'
	Low	Low mean scores on Factor 'A' but high mean scores on Factor 'B'	Respondents with low mean scores on both Factor 'A' and Factor 'B'

Figure 7. Description of Data Contained in Each of the Four Cells Created for Two-way Analysis of Variance Tests

In testing the research hypotheses derived from the last four experimental hypotheses on archetypal technologies, two respondent groups were used. First, respondents were grouped by department and departmental mean scores on the two technology variables were calculated. Only those departments with mean scores on both technology variables in excess of .50 of a scale interval from the 3.00 midpoint were considered as having defensible archetypal technologies. When it was discovered that this would mean that only five of the twelve departments could be considered, the criteria for inclusion were modified. As a result, departments with at least one mean score in excess of .50 of a scale interval from the 3.00 midpoint were included. Data relating to each of the archetypal technologies were then treated separately using the same procedure employed in testing the first set of research hypotheses.

The second respondent group involved all respondents irrespective of departmental affiliations. Individual mean scores on the two technology variables were calculated and the same criteria for inclusion used for departments were employed. Data relating to each of the archetypal technologies were then treated using the procedure described above.

Research findings resulting from two-way analysis of variance tests of the research hypotheses were then discussed in relation to the experimental hypotheses.

SUMMARY

This chapter outlined the research design for the study, the procedures employed in the selection and refinement of the instruments used in the study and concluded with a description of the research methodology.

In the research design section, the purpose and focus of the study were stated, the research variables were specified, respondents were identified and the research hypotheses derived from the experimental hypotheses were presented.

In the second section of this chapter, the procedures employed in the selection and development of the instruments used in the study were described. In the case of the technology instrument, a pilot study was required and the results were presented and discussed. In order to check to construct validity of the technology, structure and effectiveness instruments used in Lethbridge Community College, a factor analysis technique was used. The results of the factor analyses were presented and discussed. On the basis of factor analysis, research variable subscales were created. In addition, a correlation matrix for the demographic and research variables was constructed as a means of examining the relationships among these variables.

In the final section of this chapter, the research methodology was described. This section included such things as securing permission to conduct the study, the methods of data collection used and the various data treatment procedures employed in the study.

The next chapter describes the college and respondents in the study.

Chapter 5

DESCRIPTION OF THE COLLEGE AND RESPONDENTS

This chapter presents a description of the college in which the study was conducted, the response rate on the questionnaire, a description of the respondents on the basis of nine demographic variables and a description of the departments involved in the study on the basis of the seven research variables.

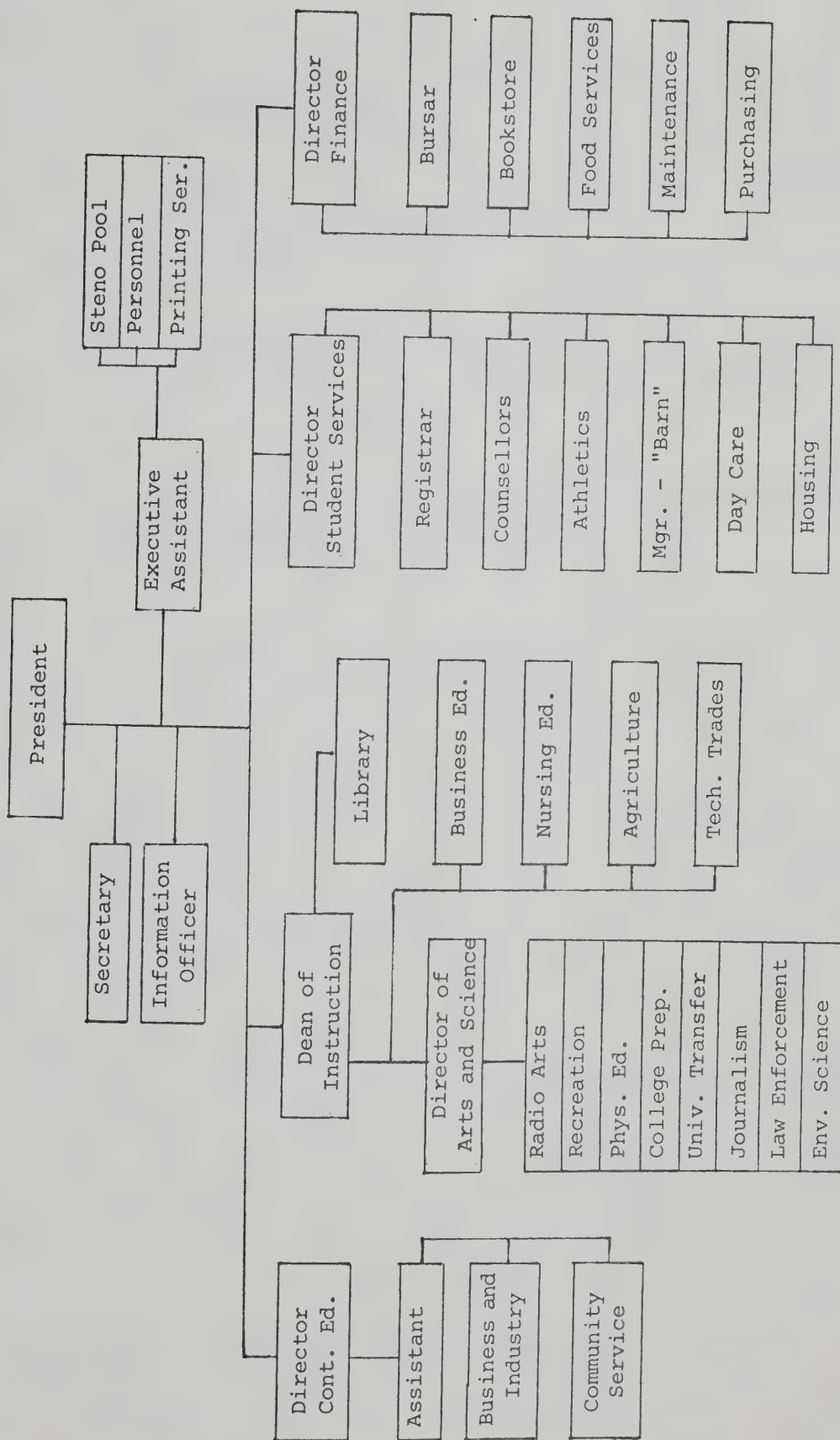
DESCRIPTION OF THE COLLEGE

Established as a Junior College in 1957, Lethbridge Community College serves approximately 1,300 students by offering a variety of technical, vocational and general education programs. In addition to regular day-time programs, the college has developed an extensive Continuing Education program as well as offering a variety of special seminars and workshops for many business, industrial and community groups in the region.

The administrative structure of Lethbridge Community College is presented in Figure 8. Basically, the college was made up of four divisions: Continuing Education, Instruction, Student Services and Finance. In addition, a number of support services such as Personnel, the Steno Pool and Printing Services were grouped in the President's Office.

Continuing Education, while divided into several departments for reasons of administrative convenience, tended to operate using a

Figure 8. Organizational Chart—Lethbridge Community College



flexible, team-oriented approach to program development and instruction. The vast majority of staff members in the Continuing Education Division were hired on an as-needed basis but there were fifteen staff members who could be considered as fulltime.

The Instructional Division, under the direction of the Dean of Instruction, was made up of three sections: Arts and Science, four Special Schools and the Library. The Director of Arts and Science supervised eight program areas involving twenty-eight fulltime instructors. Each of the four Special Schools—Business Education, Nursing, Agriculture and Technical Trades—was under the supervision of a Department Chairman. There were ten fulltime staff members in Business, seven in Nursing, nine in Agriculture and fourteen in Technical Trades. The Library, under the supervision of the Head Librarian, involved seven fulltime staff members.

The Student Services Division was made up of six sections: the Registrar, Counselling, Athletics, the Barn which was the college's recreational centre, the Day Care Centre and Housing. A total of fourteen fulltime staff members are involved in the various aspects of the Student Services Division.

The Finance Division was made up of five departments: Bursar, Bookstore, Food Services, Maintenance and Purchasing. Food Services, because it was staffed primarily by students on a foods program, was omitted from consideration in this study. There were five fulltime staff members in the Bursar's Office, three in the Bookstore, fifteen in Maintenance and four in the Purchasing department.

The President's Office included the President, an Executive

Secretary, an Information Officer, and an Executive Assistant responsible for Personnel, the Steno Pool and Printing Services. Of these, only the Steno Pool, with eight fulltime staff members, was considered as a department for the purposes of this study although data were collected from individuals associated with the President's Office.

RESPONDENTS AND RESPONSE RATE

Questionnaires were distributed to all staff members who were involved in the principal task or tasks of college departments having a minimum of four, fulltime staff members. Table 5 presents a description of the research sample in terms of (1) total number of people on staff in each division and department, (2) the number of completed questionnaires returned by each division and department, and (3) the percentage return rate for each division and department.

In the case of Continuing Education, the small number of staff members involved necessitated consideration of this division as if it were a department. In the Student Services Division, only the Counselling department qualified as a department for the purposes of this study. As a result, all other respondents from the Student Services Division were grouped together and considered as a department. Other Personnel, which included staff in the President's Office, the Dean of Instruction and the staff in the office of the Director, Finance Division, were included in data analyses which involved "all respondents" but were eliminated from consideration in the context of a specific departmental affiliation because of the insufficient numbers involved.

TABLE 5

Description of Respondents and Response Rate to
Questionnaire by Division and Department
in the College

Organizational Unit	Total Number	Number Returned	Percentage Returned
Continuing Education Division	15	13	86.7
Division of Instruction	73	40	54.8
a) Arts and Science Dept.	27	19	70.4
b) Business Education Dept.	10	0	0.0
c) Nursing Education Dept.	6	6	100.0
d) Agriculture Dept.	9	4	44.4
e) Technical Trades Dept.	14	4	28.6
f) Library	7	7	100.0
Student Services Division	14	10	71.4
a) General	10	6	60.0
b) Counselling Dept.	4	4	100.0
Finance Division	24	19	79.2
a) Bursar's Office	5	3	60.0
b) Maintenance Dept.	15	12	80.0
c) Purchasing Dept.	4	4	100.0
Steno Pool	8	7	87.5
Other Personnel**	8	8	100.0
Overall	142	97	69.5

** Other Personnel included staff in the President's Office, the Dean of Instruction and personnel in the office of the Director, Finance Division.

Although response rates were lower than anticipated in a number of college departments, only the Business Education Department was dropped from further consideration.

DESCRIPTION OF THE RESPONDENTS

Data were collected on nine personal and demographic variables for the purposes of describing and grouping respondents in this study.

Sex of Respondents

The distribution of sample respondents by sex for divisions and departments in the college is presented in Table 6. The sample was composed of 58.4% males and 41.6% females which approximated the overall distribution among staff in the college as a whole. In the Continuing Education Division, there were 61.5% female respondents as compared to 38.5% males. In the Division of Instruction, there were approximately twice as many male respondents as female. Males dominated respondents from Arts and Science, Agriculture and Technical Trades with 95.0%, 100% and 100% males respectively. On the other hand, 100% of the respondents from Nursing Education and 85.7% from the Library were female.

Student Services involved an even split between males and females although two-thirds of the six people on the general staff were female while 75% of the Counselling staff were males.

In the Finance Division, 78.9% of respondents were male. At the departmental level within the Finance Division, only 33.3% of respondents in the Bursar's Office were male as compared with 91.7% in Maintenance and 75.0% in Purchasing.

TABLE 6
Sex of Respondents by Divisional and
Departmental Groupings
N = 89

Department	Male		Female		Total
	N	%	N	%	
Continuing Education	5	38.5	8	61.5	13
Instruction	27	67.5	13	32.5	40
a) Arts and Science	18	94.7	1	5.3	19
b) Nursing Education	0	0.0	6	100.0	6
c) Agriculture	4	100.0	0	0.0	4
d) Technical Trades	4	100.0	0	0.0	4
e) Library	1	14.3	6	85.7	7
Student Services	5	50.0	5	50.0	10
a) General	2	33.3	4	66.7	6
b) Counsellors	3	75.0	1	25.0	4
Finance	15	78.9	4	21.1	19
a) Bursar's Office	1	33.3	2	66.7	3
b) Maintenance	11	91.7	1	8.3	12
c) Purchasing	3	75.0	1	25.0	4
Steno Pool	0	0.0	7	100.0	7
Overall	52	58.4	37	41.6	89

All respondents from the Steno Pool were female.

Age of Respondents

The age categories of respondents grouped by division and department are presented in Table 7. The median age of respondents in Continuing Education was 31.3 years. The median age for respondents in the Division of Instruction was 37.4 years. Median ages of respondents in each of the departments which made up the Division of Instruction ranged from a low of 34.3 years in the Library to a high of 46.5 years in Agriculture. Median age of respondents in both the Arts and Science and Technical Trades departments was 40.5 years. In Nursing Education, the median age of respondents was 35.5 years.

In the Student Services Division, the median age of all respondents was 31.7 years. Median age of respondents in the general staff was 25.5 years but 35.5 years for the Counselling staff.

In the Finance Division, the median age of all respondents was 44.3 years which was the highest of all divisions in the college. This was broken down into median ages of 41.7 years in the Bursar's Office, 49.2 years in Maintenance and 35.5 years in Purchasing.

The Steno Pool respondents had a median age of 33.0 years.

When taken from the perspective of all respondents in the study, the median age for the research sample was calculated at 39.2 years.

Educational Level of Respondents

Table 8 presents the highest educational level achieved by respondents grouped by divisions and departments. Of the thirteen

TABLE 7

Age Categories of Respondents by Divisional and Departmental Groupings
N = 89

Department	20 yrs or less	21-25 yrs.	26-30 yrs.	31-35 yrs.	36-40 yrs.	41-45 yrs.	46-50 yrs.	51-55 yrs.	56 or older	Total	Median Age
Continuing Education		2	4	3	2	1	1			13	31.3
Instruction	1	1	5	10	8	3	7			40	37.4
a) Arts and Science			3	4	2	1	6		5	19	40.5
b) Nursing Educ.	1		1	2	2	1			2	6	35.5
c) Agriculture				1	1		1		1	4	46.5
d) Technical Trades				1	1	1			1	4	40.5
e) Library		1	1	2	2				1	7	34.3
Student Services		3	1	4	1		1			10	31.7
a) General		3	1	2						6	25.5
b) Counsellors				2	1		1			4	35.5
Finance			2	1	3	5	3	1	4	19	44.3
a) Bursar's Office					1	2				3	41.7
b) Maintenance				1	1	3	3		4	12	49.2
c) Purchasing			2		1			1		4	35.5
Steno Pool	1	1	1	2		1			1	7	33.0
Overall	2	7	13	20	14	10	12	1	10	89	39.2
%	2.2	8.0	14.6	22.5	15.7	11.2	13.5	1.1	11.2	100.0	

TABLE 8

Highest Educational Level Achieved by Divisional
and Departmental Grouping
N = 89

Department	Grades 1-12		College or Tech. Inst.		University		Other*	
	N	%	N	%	N	%	N	%
Continuing Education			1	7.7	12	92.3		
Instruction	2	5.0	5	12.5	32	80.0	1	2.5
a) Arts and Science			1	5.3	17	89.4	1	5.3
b) Nursing					6	100.0		
c) Agriculture					4	100.0		
d) Technical Trades			3	75.0	1	25.0		
e) Library	2	28.6	1	14.3	4	57.1		
Student Services			4	40.0	6	60.0		
a) General			4	66.7	2	33.3		
b) Counselling					4	100.0		
Finance	14	73.7	5	26.3				
a) Bursar's Office	3	100.0						
b) Maintenance	9	75.0	3	25.0				
c) Purchasing	2	50.0	2	50.0				
Steno Pool	5	71.4	2	28.6				
Overall	21	23.6	17	19.1	50	56.2	1	1.1

* Accredited training from an agency other than those listed.

respondents in Continuing Education, twelve or 92.3% had attended university. In the Division of Instruction, the highest level of education achieved was slightly lower as 80% had attended university. In Arts and Science 89.4% had attended university in comparison with 100% of respondents in both Nursing Education and Agriculture. In the Technical Trades department, 75% of respondents had attended a college or technical institute while 25% had attended university. The spread on this variable was greatest in the Library where 28.6% of respondents had completed high school, 14.3% had attended college and 57.1% had attended university.

In Student Services, 66.7% of the general staff had attended college or a technical institute while 33.3% had attended university. This compared with 100% of the respondents in Counselling who had attended university.

In the Finance Division, none of the respondents had attended university while a majority, fourteen of the nineteen or 73.7% had completed high school only. All three respondents in the Bursar's Office had completed high school. In Maintenance, 75% had completed high school while 25% had attended a college or technical institute. Respondents in the Purchasing department split evenly with 50% having completed high school and 50% having attended a college or technical institute.

Respondents in the Steno Pool indicated that 71.4% had completed high school while 28.6% had attended a college or technical institute.

When viewed from the perspective of all respondents in the

sample, twenty-one or 23.6% had completed high school, seventeen or 19.1% had attended a college or technical institute, fifty or 56.2% had completed university and one or 1.1% had received credit from a training agency other than those listed.

Highest Educational Certification Held by Respondents

The highest educational certification held by respondents grouped by divisions and departments is presented in Table 9. Of the thirteen respondents in Continuing Education, one had a college diploma, seven had achieved Bachelor's degrees and five had completed Master's programs. In the Division of Instruction, one had a high school diploma, six had college diplomas, fourteen had Bachelor's degrees, seventeen had completed Master's programs and two had undertaken doctoral programs. In the departments which made up the Division of Instruction, fourteen of the twenty staff members in Arts and Science had Master's degrees while one had a college diploma, three had Bachelor's degrees and one had undertaken a doctoral program. All six respondents in Nursing Education had Bachelor's degrees. In Agriculture, three respondents had Master's degrees and one had completed a doctoral program. Three of the four respondents from Technical Trades had college diplomas, or their equivalent and one had a Bachelor's degree. The Library staff was composed of one respondent with a high school diploma, two with college diplomas and four with Bachelor's degrees.

Of the ten respondents in Student Services, four of the general staff had college diplomas, two had Bachelor's degrees while

TABLE 9

Highest Educational Certification Attained by Divisional and
Departmental Groupings

N = 89

Department	High School	College Diploma	Bachelor's Degree	Master's Degree	Doctorate
Continuing Education		1	7	5	
Instruction	1	6	14	17	2
a) Arts & Science		1	3	14	1
b) Nursing			6		
c) Agric.				3	1
d) Tech. Trades		3	1		
e) Library	1	2	4		
Student Services		4	2	4	
a) General		4	2		
b) Coun- selling				4	
Finance	14	5			
a) Bursar	3				
b) Mainten- ance	9	3			
c) Purchasing	2	2			
Steno Pool	4	3			
Overall	N	19	23	26	2
	%	21.3	25.8	29.3	2.3

all four members of the Counselling staff had completed Master's programs.

In the Finance Division, fourteen of the nineteen respondents had completed high school while the remainder had achieved college diplomas. In the Bursar's Office, all three respondents had high school diplomas. The Maintenance staff was divided into nine with high school diplomas and three with college of technical institute diplomas. The Purchasing department staff split evenly with two respondents having completed high school and two with college diplomas.

Of the seven respondents in the Steno Pool, four had completed high school and three had earned college diplomas.

In relationship to the total sample, nineteen or 21.3% had completed high school, nineteen or 21.3% had college diplomas or their equivalent, twenty-three or 25.8% had earned Bachelor's degrees, twenty-six or 29.3% had Master's degrees and two or 2.3% of the sample had undertaken doctoral programs.

Job Titles of Respondents

Respondents were drawn from all fulltime departmental staff members engaged in the principal task or tasks of their respective departments. In Table 10, respondents are described by the distribution of job titles in divisions and departments of the college. Of the thirteen respondents in Continuing Education, one was a Division Director, ten were classified as Instructors, one was an Administrative Assistant and one was an Executive Secretary. In the Division of Instruction, one was classified as a Division Director or equivalent, three were Department Heads, thirty respondents were Instructors, one

TABLE 10

Job Titles of Respondents by Divisional and Departmental Groupings
N = 89

Department	Division Director	Dept. Head	Inst- ructor	Coun- seller	Libra- rian	Adm. Ass. or Equiv.	Aide or Assist.	Exec. Sec.	Clerk Typist	Other*
Continuing Education	1		10		1		1			
Instruction	1	3	30		1		5			
a) Arts & Science	1		18							
b) Nursing			6							
c) Agric.		1	3							
d) Tech. Trades		1	3							
e) Library		1			1		5			
Student Services										
a) General			1	4		2		1	2	
b) Counsellors			1			2		1	2	
Finance										
a) Bursar		3							3	13
b) Maintenance		1							2	
c) Purchasing		1							1	11
		1							2	
Steno Pool						2			5	
Overall	2	6	41	4	1	5	5	2	10	13
%	2.2	6.7	46.1	4.5	1.1	5.6	5.6	2.2	11.2	14.6

* This group includes personnel in the Maintenance and Purchasing departments.

was a Librarian, and five were classified as Library Assistants or Aides according to the college's classification system. In Arts and Science, one respondent was a Division Director and eighteen were Instructors. All six respondents from Nursing Education were Instructors. In both Agriculture and Technical Trades, one respondent was a Department Head and three were Instructors. Of the seven respondents from the Library, one was a Department Head, one was a Librarian and five were classified as Library Assistants or Aides.

In the Student Service Division, one respondent was an Instructor, four were Counsellors, two were classified as Administrative Assistants, one was an Executive Secretary and two were Clerk-typists.

Three of the nineteen respondents from the Finance Division were Department Heads, three were Clerk-typists and thirteen were classed as Other which meant either maintenance workers or people in purchasing. The Bursar's Office respondents were divided into one Department Head and two Clerk-typists. Respondents from the Maintenance department were divided into one Department Head and eleven maintenance people. Respondents from the Purchasing department included one Department Head, one Clerk-typist and two staff members involved in the general functioning of the department.

Two of the seven respondents from the Steno Pool had the responsibilities of Administrative Assistants while the remaining five were classified as Clerk-typists.

Of the total sample, 2.2% were Division Directors, 6.7% were Department Heads, 46.1% were Instructors, 4.5% were Counsellors, 1.1% were Librarians, 5.6% were Administrative Assistants or

equivalent, 5.6% were Aides or Assistants, 2.2% were Executive Secretaries, 11.2% were Clerk-typists and 14.6% were involved in maintenance or purchasing.

Work Experience of Respondents

Data were collected from respondents regarding the length of work experience in terms of (1) number of years in present job, (2) number of years in this college, (3) number of years doing similar work, and (4) number of years of work experience since leaving high school.

Work experience in present job. Table 11 presents the frequency distribution of respondents distributed according to the number of years in their present jobs by divisional and departmental groupings. Of all divisions in the college, Continuing Education respondents had the lowest number of years in their present job with a median of 2.1 years. In the Division of Instruction, the median for number of years spent working in the present job was 4.5 years. In terms of departments within the division, respondents in Arts and Science had been engaged in their present jobs for longer than those in any other department within the Division of Instruction with a median of 5.2 years. Agriculture was next in terms of length of experience with a median of 4.5 years. Nursing Education and Technical Trades had the same median of 3.5 years although the range was greater in the case of Nursing Education. The Library staff represented a median of 2.0 years in their present job.

In the Student Services Division, staff members had worked in

TABLE 11

Years in Present Job by Divisional and Departmental Groupings
N = 89

Department	One Year	Two Years	Three Years	Four Years	Five Years	6-10 Years	11-15 Years	16-20 Years	21 Years or more	Median in years
Continuing Education	6	4		2		1				2.1
Instruction	5	2	6	7	11	5	4			4.5
a) Arts & Science	1		2	3	5	4	4			5.2
b) Nursing	1	1	1	1	2					3.5
c) Agriculture			1	1	1	1				4.5
d) Tech. Trades			2	1	1					3.5
e) Library	3	1		1	2					2.0
Student Services	4	1	1	2	2					2.5
a) General	3		1	2						2.0
b) Counselling	1	1			2					3.5
Finance										
a) Bursar				3	1	13	2			7.6
b) Maintenance						2	1			9.3
c) Purchasing				3	1	7	1			7.3
Steno Pool	2	2	1	2		4				8.0
Overall	17		8	16	14	19	6			2.3
%	19.1	1 .	9.0	18.0	15.7	21.3	6.7			4.1

their present jobs for a median of 2.5 years. The general staff had a median of 2.0 years experience while the Counselling staff represented a median of 3.5 years.

The highest median on years of experience in present job for all divisions occurred in the Finance Division with a median of 7.6 years. The medians for the departments within the Finance Division were 9.3 years for the Bursar's Office, 7.3 years for Maintenance and 8.0 years for Purchasing.

In the Steno Pool, the number of years in the present job ranged from one to four years with the median being 2.3 years.

In terms of the total sample, seventeen or 19.1% had one year's experience, nine or 10.1% had two years, eight or 9.0% had five years, nineteen or 21.3% had between six and ten years of experience, and six or 6.7% of respondents had between eleven and fifteen years of experience on their present job. The median for the total sample was 4.1 years of experience in the present job.

Work experience in the college. As indicated in Table 12, the number of years worked in the college was similar to, but slightly higher than was the case on the previous variable. The respondents in Continuing Education had worked in the college for a median of 2.1 years. In the Division of Instruction, the median for years worked in the college was 4.9 years. Respondents in Arts and Science had worked in the college for a median of 6.0 years which was the highest median score on this variable within the Division of Instruction. Agriculture respondents were next with a median of 4.5 years. Both Nursing Education and Technical Trades had the same median of

TABLE 12

Years Working in the College by Divisional and Departmental Groupings
N = 89

Department	One Year	Two Years	Three Years	Four Years	Five Years	6-10 Years	11-15 Years	16-20 Years	21 Years or more	Median in years
Continuing Education	6	2		4		1				2.1
Instruction	5	1	7	5	9	6	4	3		4.9
a) Arts & Science	1		2	1	3	5	4	3		6.0
b) Nursing	1	1	1	1	2					3.5
c) Agriculture			1	1	1	1				4.5
d) Tech. Trades			2	1	1					3.5
e) Library	3		1	1	2					3.0
Student Services	4	1	1	2	2					2.5
a) General	3		1	2						2.0
b) Counselling	1	1			2					3.5
Finance										
a) Bursar				3	1	13	2			7.6
b) Maintenance						2	1			9.3
c) Purchasing				3	1	7	1			7.3
						4				8.0
Steno Pool	2	2	1	2						2.3
Overall	17	6	9	16	12	20	6	3		4.3
%	19.1	6.7	10.1	18.0	13.5	22.5	6.7	3.4		

3.5 years. The Library staff was the lowest in the division in terms of years worked in the college with a median of 3.0 years.

Respondents in Student Services had worked in the college for a median of 2.5 years. The general staff had worked for a median of 2.0 years which was the lowest in the college. Counselling staff had worked in the college for a median of 3.5 years.

Respondents from the Finance Division had the highest median for years worked in the college of any division with a median of 7.6 years. Departmental medians within the division were 9.3 years for the Bursar's Office, 7.3 years for Maintenance and 8.0 years of work in the college for Purchasing.

Respondents in the Steno Pool had worked in the college for a median of 2.3 years.

In relationship to the total sample, seventeen or 19.1% had worked in the college for one year, six or 6.7% had worked for two years, nine or 10.1% had worked for three years, sixteen or 18.0% had worked for four years, twelve or 13.5% had worked for five years, twenty or 22.5% had worked for six to ten years, six or 6.7% had worked in the college for eleven to fifteen years and three or 3.4% had been with the college for sixteen to twenty years. The median for the total sample was 4.3 years.

Work experience doing similar work. Table 13 presents the frequency distributions of respondents in the number of years of similar work experience by divisional and departmental groupings. In Continuing Education, respondents had engaged in similar work for a median of 3.7 years which was the lowest of all departments in the

TABLE 13

Years of Similar Work Experience by Divisional and Departmental Groupings
N = 89

Department	One Year	Two Years	Three Years	Four Years	Five Years	6-10 Years	11-15 Years	16-20 Years	21 Years or more	Median in years
Continuing Education	3	2	1	3	2	2				3.7
Instruction	1	3	1	2	4	21	4	1	3	5.9
a) Arts & Science										
b) Nursing		2			3	9	1	1	3	6.0
c) Agriculture						4	2			9.2
d) Tech. Trades			1	1	1	1				4.5
e) Library	1	1		1		3	1			8.8
						4				5.6
Student Services	1			3	4	1	1			4.8
a) General				3	2	1				4.5
b) Counselling	1				2		1			5.0
Finance										
a) Bursar					1	7	4		7	10.9
b) Maintenance						1	2			10.7
c) Purchasing					1	3	2		6	18.0
						3			1	8.0
Steno Pool		2			2	1	1		1	5.3
Overall	5	7	2	8	13	32	10	1	11	5.8
%	5.6	7.9	2.2	8.9	14.7	35.9	11.3	1.1	12.4	

college. In the Division of Instruction, the median for years of similar work experience was 5.9 years. In Arts and Science, the median was 6.0 years of similar work experience. Of all respondents in the division, those in Nursing Education had the highest median—9.2 years—on years of similar work experience. Technical Trades followed closely with a median of 8.8 years. Respondents in the Library had engaged in similar work for a median of 5.6 years while respondents in Agriculture had engaged in similar work for only 4.5 years.

The median for years of experience doing similar work for respondents in the Student Services Division was 4.8 years. The median for the general staff was 4.5 years while the Counsellors remained consistently higher with a median of 5.0 years of experience.

As with the previous work experience variables, respondents from the Finance Division had the highest median of all divisions in the college with a median of 10.9 years. Within the division, the Maintenance department respondents had the most years of similar work experience with a median of 18.0 years. The Bursar's Office respondents were next with a median of 10.7 years. The median for Purchasing was 8.0 years.

Respondents from the Steno Pool had a median of 5.8 years of experience doing similar work.

From the perspective of the total sample, five or 5.6% had worked at similar jobs for one year, seven or 7.9% had worked for two years, two or 2.2% had worked for three years, eight or 8.9% had worked for four years, thirteen or 14.7% of the total had worked for five years, thirty-two or 35.9% had worked for six to ten years at

similar jobs, ten or 11.3% had worked for eleven to fifteen years, one or 1.1% had worked for sixteen to twenty years and eleven or 12.4% of the sample had worked at similar jobs for twenty-one years or more. The median for the total sample was 5.8 years of experience doing similar work.

Total work experience since leaving high school. Table 14 presents a frequency distribution of total work experience of respondents by divisional and departmental groupings. The median for respondents from Continuing Education was the lowest of all divisions in the college at 7.4 years. Respondents in the Division of Instruction had worked for a median of 13.8 years. The total work experience of respondents in Arts and Science was the highest of all departments within the division at 18.0 years. This was followed by Technical Trades at 15.5 years, Nursing Education at 13.0 years, the Library at 11.3 years and Agriculture at 8.8 years.

Student Services Division respondents had worked for a median of 10.5 years since leaving high school. A major difference in total work experience emerged when the general staff was compared with the Counsellors. The median for the general staff was 5.5 years while the median for the Counselling staff was 18.0 years.

Respondents from the Finance Division once more were the highest in the college with a median of 21.5 years of work experience since leaving high school. The median for Maintenance department respondents was 21.8 years, closely followed by respondents from the Bursar's Office at 21.7 years. In the Purchasing department, respondents had worked for a median of 15.5 years since leaving high school.

TABLE 14

Years of Work Experience Since Leaving High School by Divisional and Departmental Groupings
N = 89

Department	One Year	Two Years	Three Years	Four Years	Five Years	6-10 Years	11-15 Years	16-20 Years	21 Years or more	Median in years
Continuing Education			1	2		9	1			7.4
Instruction			1		2	11	9	6	11	13.8
a) Arts & Science										
b) Nursing					2	4	2	3	8	18.0
c) Agriculture						2	2	2		13.0
d) Tech. Trades						3			1	8.8
e) Library			1			2	2	1	1	15.5
							3		1	11.3
Student Services										
a) General				2	1	2	1	2	2	10.5
b) Counselling				2	1	1		2		5.5
						1	1		2	18.0
Finance										
a) Bursar						3	1	3	12	21.5
b) Maintenance						1			2	21.7
c) Purchasing						2	1	3	8	21.8
									2	15.5
Steno Pool		1				3	1	1	1	9.7
Overall										
N	1	1	2	4	3	28	13	12	26	13.0
%	1.1	1.1	2.3	4.5	3.4	31.5	14.6	13.5	29.2	

Steno Pool respondents had worked for a median of 9.7 years.

Of the total sample, one or 1.1% had worked for two years, two or 2.3% had worked for three years, four or 4.5% had worked for four years, three or 3.4% had worked for five years, twenty-eight or 31.5% had worked for six to ten years, thirteen or 14.0% of the sample had worked for eleven to fifteen years, twelve or 13.5% had worked for sixteen to twenty years and twenty-six or 29.2% of the sample had worked for twenty-one years or more since leaving high school. The median for the total sample was 13.0 years of work experience since leaving high school.

DESCRIPTION OF DEPARTMENTS ON THE BASIS OF THE SEVEN RESEARCH VARIABLES

In order to describe the departments involved in the study and to test the hypotheses, perceptual data were collected from respondents relating to the seven research variables in the study: Exceptions and Search, the two technology variables; Formalization and Expertise, the two structural variables; and Productivity, Adaptability and Overall Effectiveness, the three effectiveness variables. In this section, the twelve departments in the study are described by presenting them in rank order on the basis of mean scores on each of the seven research variables.

Description of Departments in Terms of Perceived Work Technology

Perceptual data were collected from respondents relating to the two technology variables in this study: the number of exceptional cases encountered in the job (Exceptions) and the extent of the search

behaviour required to handle the exceptional cases encountered (Search).

Description of departments on perceived Exceptions. Table 15 presents the departments in descending rank order on the basis of mean scores on perceived Exceptions. A high mean score means that respondents perceived that many exceptional cases were encountered in the work of their department.

TABLE 15

Rank Order of Departments by Mean Scores on
the Technology Variable, Exceptions

Department	n	Mean Score on Exceptions
Library	7	4.24
Counselling	4	4.17
Student Services	6	4.11
Agriculture	4	4.00
Technical Trades	4	4.00
Bursar's Office	3	4.00
Purchasing	4	4.00
Nursing Education	6	3.98
Arts and Science	19	3.97
Continuing Education	13	3.69
Maintenance	12	2.92
Steno Pool	7	2.92

The Library, Counselling and Student Services ranked highest on mean Exceptions which meant that respondents in these departments perceived that many exceptional cases were encountered in their work. Agriculture, Technical Trades, the Bursar's Office and Purchasing came

next in rank order with identical 4.00 mean scores on perceived Exceptions. Nursing Education and Arts and Science were close behind with mean scores of 3.98 and 3.97 respectively on Exceptions. Continuing Education, with a mean score of 3.69 on Exceptions, stood somewhat isolated from those above or below in the rank order. Maintenance and the Steno Pool tied for the lowest mean score of all departments in the college with a mean of 2.92 on Exceptions. This meant that respondents in Maintenance and the Steno Pool perceived their work to involve fewer exceptional cases encountered than did respondents in any other departments in the college.

Description of departments on perceived Search. Table 16 presents the departments in descending rank order on the basis of mean scores on perceived Search. A high mean score means that respondents perceived an extensive search behaviour required in order to handle exceptional cases encountered in the work of their department.

Nursing Education, with a mean of 3.98 on Search, was the highest of all departments on this variable. This meant that respondents in Nursing Education perceived a more extensive search behaviour required to handle the exceptional cases encountered in their departmental work than did respondents in any of the other departments in the college. Next in rank order came Counselling with a mean score of 3.32 on Search. The next four departments in rank order—Arts and Science, Agriculture, Technical Trades and Continuing Education—were all instructional departments with mean scores ranging from 3.10 down to 3.02 on Search. Purchasing, Student

Services, the Library and the Bursar's Office tended to group together with mean scores ranging from 2.47 down to 2.34 on Search. As was the

TABLE 16

Rank Order of Departments by Mean Scores on
the Technology Variable, Search

Department	n	Mean Score on Search
Nursing Education	6	3.98
Counselling	4	3.32
Arts and Science	19	3.10
Agriculture	4	3.05
Technical Trades	4	3.05
Continuing Education	13	3.02
Purchasing	4	2.47
Student Services	6	2.40
Library	7	2.35
Bursar's Office	3	2.34
Maintenance	12	2.19
Steno Pool	7	2.02

case on the Exceptions variable, Maintenance and the Steno Pool had the lowest mean scores on Search with means of 2.19 and 2.02 respectively. This meant that respondents in Maintenance and the Steno Pool perceived a relatively minimal search behaviour required in order to handle the exceptional cases encountered in their departmental work.

Description of Departments in Terms of Perceived Organizational Structure

Perceptual data were collected from respondents relating to

the two structural variables in this study: Emphasis on Formalization and Emphasis on Expertise.

Description of departments on perceived Formalization. Table 17 presents the departments in descending rank order on the basis of mean scores on perceived emphasis on Formalization. A high mean score means that respondents perceived a high emphasis of Formalization.

TABLE 17

Rank Order of Departments by Mean Scores on
the Structural Variable, Formalization

Department	n	Mean Scores on Formalization
Maintenance	12	3.22
Steno Pool	7	3.01
Bursar's Office	3	2.91
Technical Trades	4	2.80
Agriculture	4	2.67
Continuing Education	13	2.65
Student Services	6	2.65
Library	7	2.59
Purchasing	4	2.53
Arts and Science	19	2.47
Nursing Education	6	2.23
Counselling	4	1.87

Maintenance and the Steno Pool were the highest departments in terms of perceived Formalization with mean scores of 3.22 and 3.01 respectively. This meant that respondents in these two departments perceived a higher emphasis on Formalization than did respondents in other departments in the college. The next two departments in rank

order were the Bursar's Office and Technical Trades with mean scores on Formalization of 2.91 and 2.80 respectively. The next six departments—Agriculture, Continuing Education, Student Services, the Library, Purchasing and Arts and Science—tended to group together with mean scores ranging from 2.67 to 2.47 on Formalization. The two departments with the lowest mean scores on Formalization were Nursing Education and Counselling with means of 2.23 and 1.87 respectively. This meant that respondents in these two departments perceived Formalization to be lower than did respondents in any of the other departments in the college.

Description of departments on perceived Expertise. Table 18 presents the departments in descending rank order on the basis of means scores on perceived emphasis on Expertise. A high mean score means that respondents perceived a high emphasis on Expertise.

Counselling, with a mean score of 4.37, was the highest of all departments on perceived emphasis on Expertise. This meant that respondents in the Counselling department perceived that a greater emphasis was placed on Expertise in their department than did respondents in any other department in the college. Nursing Education, the Bursar's Office, the Steno Pool and Maintenance were the next highest in rank order. Nursing Education, the Bursar's Office and the Steno Pool were tied with mean scores of 4.17 on Expertise while Maintenance followed closely behind with a 4.11 mean score. Arts and Science, Purchasing and Student Services were next in rank order with mean scores of 3.91, 3.83 and 3.80 respectively on Expertise. The Library, with a mean score of 3.43, was slightly ahead of Agriculture

and Continuing Education, with mean scores of 3.33 and 3.30 respectively on Expertise. The lowest of all departments was Technical Trades with a mean score of 2.90 on perceived emphasis on Expertise.

TABLE 18

Rank Order of Departments by Mean Scores on
the Structural Variable, Expertise

Department	n	Mean Score on Expertise
Counselling	4	4.37
Nursing Education	6	4.17
Bursar's Office	3	4.17
Steno Pool	6	4.17
Maintenance	12	4.11
Arts and Science	19	3.91
Purchasing	4	3.83
Student Services	6	3.80
Library	7	3.43
Agriculture	4	3.33
Continuing Education	13	3.30
Technical Trades	4	2.90

This meant that respondents in Technical Trades perceived the emphasis on Expertise to be lower in their department than did respondents in any other department in the college.

Description of Departments in Terms of Perceived Organizational Effectiveness

Perceptual data were collected from respondents relating to the three organizational effectiveness variables in this study: Productivity, Adaptability and Overall Effectiveness.

Description of departments on perceived Productivity. Table 19 presents the departments in descending rank order on the basis of mean scores on perceived Productivity. A high mean score means that respondents perceived high Productivity.

TABLE 19

Rank Order of Departments by Mean Scores on
the Effectiveness Variable, Productivity

Department	n	Mean Scores on Productivity
Nursing Education	6	4.56
Bursar's Office	3	4.55
Purchasing	4	4.50
Student Services	6	4.44
Counselling	4	4.33
Library	7	4.33
Steno Pool	6	4.14
Continuing Education	13	4.03
Agriculture	4	4.00
Arts and Science	19	3.96
Technical Trades	4	3.89
Maintenance	12	3.67

Nursing Education, the Bursar's Office and Purchasing obtained the highest mean scores on perceived Productivity of all departments in the college. Next in rank order came Student Services with a mean score on Productivity of 4.44, followed by Counselling and the Library with identical 4.33 mean scores on perceived Productivity. The Steno Pool had a mean score of 4.14 on Productivity. Continuing Education, Agriculture and Arts and Science were next in rank order with mean

scores of 4.03, 4.00 and 3.96 respectively on perceived Productivity. Technical Trades, with a mean of 3.89, and Maintenance, with a mean of 3.67, were the lowest of the twelve departments in terms of perceived Productivity. This meant that respondents in these two departments perceived Productivity to be lower in their departments than did respondents in any of the other departments in the college.

Description of departments on perceived Adaptability. Table 20 presents the departments in descending rank order on the basis of mean scores on perceived Adaptability. A high mean score means that respondents perceived that Adaptability was high.

TABLE 20

Rank Order of Departments by Mean Scores on
the Effectiveness Variable, Adaptability

Department	n	Mean Scores on Adaptability
Purchasing	4	4.54
Bursar's Office	3	4.17
Library	7	4.12
Student Services	6	4.11
Technical Trades	4	4.11
Nursing Education	6	4.00
Counselling	4	3.78
Continuing Education	13	3.78
Agriculture	4	3.78
Steno Pool	7	3.62
Arts and Science	19	3.60
Maintenance	12	3.54

Purchasing was found to have the highest mean score on

perceived Adaptability. This meant that respondents in Purchasing perceived that Adaptability in their department was higher than did respondents in any other departments in the college. The next five departments—the Bursar's Office, the Library, Student Services, Technical Trades and Nursing Education—tended to group together next in rank order with mean scores ranging from 4.17 to 4.00 on perceived Adaptability. Counselling, Continuing Education and Agriculture were next in the rank order and tied with identical mean scores of 3.78 on perceived Adaptability. The Steno Pool, Arts and Science and Maintenance were the lowest in rank order of perceived Adaptability. This meant that these respondents perceived less Adaptability in their departments than did respondents in any of the other departments in their college.

Description of departments on perceived Overall Effectiveness.

Table 21 presents the departments in descending rank order on the basis of mean scores on perceived Overall Effectiveness. A high mean score means that respondents perceived the Overall Effectiveness to be high.

Counselling and the Bursar's Office, with mean scores of 4.75 and 4.67 respectively on perceived Overall Effectiveness, were the highest of all the departments in the college. This meant that respondents in these two departments perceived the Overall Effectiveness of their respective departments to be higher than did respondents in any other department in the college. Next in rank order came Purchasing with a mean score of 4.50 on perceived Overall Effectiveness. Technical Trades and the Library grouped closely together

with mean scores of 4.33 and 4.29 respectively on perceived Overall Effectiveness. Nursing Education and Student Services had identical 4.17 mean scores on perceived Overall Effectiveness. Agriculture,

TABLE 21

Rank Order of Departments by Mean Scores on the Effectiveness Variable, Overall Effectiveness

Department	n	Mean Scores on Overall Effectiveness
Counselling	4	4.75
Bursar's Office	3	4.67
Purchasing	4	4.50
Technical Trades	4	4.33
Library	7	4.29
Nursing Education	6	4.17
Student Services	6	4.17
Agriculture	4	4.00
Continuing Education	13	4.00
Steno Pool	7	4.00
Arts and Science	19	3.79
Maintenance	12	3.58

Continuing Education and the Steno Pool achieved the same 4.00 mean scores on perceived Overall Effectiveness. Arts and Science, with a mean score of 3.79, and Maintenance, with a mean score of 3.58, were the two lowest departments in the college on perceived Overall Effectiveness. This meant that respondents in both Arts and Science and Maintenance perceived the Overall Effectiveness of their departments to be lower than did respondents in any other department in the college.

DIFFERENCES AMONG DEPARTMENTS ON THE DEMOGRAPHIC AND RESEARCH VARIABLES

Originally, it had been intended to use an analysis of variance technique as a means of ascertaining if there were any significant differences among departmental mean scores on the demographic and research variables. When it was discovered that the numbers of respondents in many departments were so small, it was decided that the results of analysis of variance would not be particularly meaningful. Under these circumstances, differences would have to be extreme in order for them to be statistically significant. An examination of departmental mean scores on the demographic variables tended to suggest that there might be some significant differences among departments. On the other hand, the correlation matrix presented in the previous chapter had demonstrated that the demographic and research variables were relatively independent. This meant that the hypotheses, which dealt exclusively with the research variables, could be tested without controlling for possible effects by demographic variables.

An examination of the departmental mean scores on the research variables tended to suggest that, in all likelihood, there would be few significant differences. In the case of all three effectiveness variables, for example, the range of mean scores was little more than one scale interval between the top and bottom. A similar finding occurred in the case of the technology variables. The majority of departmental mean scores on Exceptions were found to be within a quarter of a scale interval of one another; only in the cases of

Maintenance and the Steno Pool were the mean scores on Exceptions appreciably lower than the remainder. Departmental mean scores on the technology variable, Search, tended to spread out a little more but again, the actual differences were not that great except perhaps in the case of Nursing Education which had an appreciably higher mean score on Search in comparison to the majority of departments.

In the case of the two structural variables, departmental mean scores on both Formalization and Expertise were found to be within roughly 1.4 of a scale interval from top to bottom.

These observations tended to suggest that there would be problems in testing the hypothesized relationships among the research variables. Ideally, one would have wished to obtain a greater range of mean scores on each of the research variables in order to test the hypothesized relationships. Nevertheless, it was decided to continue with the remainder of the study as planned, acknowledging the potential problems raised by the fact that departmental mean scores obtained on each of the seven research variables tended to reflect less perceived intraorganizational differences than had been expected by the researcher.

SUMMARY

This chapter presented a brief description of the college, information regarding the response rate to the questionnaire, a description of respondents in terms of nine demographic variables and a description of the twelve departments when rank ordered on the basis of mean scores on the seven research variables.

Table 22 presents a summary of departments in descending rank order on the basis of seven demographic variables. Some general trends were detected in the rank ordering of departments on these variables. For example, respondents in Continuing Education were among the youngest in the college, among the highest on the two education variables and had the lowest average work experience of all departments in the college. This suggested that Continuing Education instructors tended to be young, well prepared but lacked extensive work experience. On the other hand, respondents in the Bursar's Office and Maintenance were among the oldest in the college, had the lowest formal educational preparation and were among the highest in terms of work experience.

Table 23 presents a summary of departments in descending rank order on the basis of mean scores on the seven research variables. It must be borne in mind that the rank ordering of departments on mean scores tends to mask the fact that the actual differences in mean scores on the seven research variables were not that great. It was possible to identify some general trends however. Counselling, which ranked high on both Exceptions and Search, was the lowest of all departments on Formalization but the highest on Expertise. In terms of the effectiveness variables, the mean scores on both Productivity and Adaptability were average in relation to other departments but highest on Overall Effectiveness. Maintenance, on the other hand, was low on both of the technology variables, tended to be high on both structural variables and the lowest of all twelve departments on each of the three effectiveness variables. The mean scores obtained

TABLE 22
Rank Order of Departments by Seven Demographic Variables

Department	Age	Educational Level	Educational Certification	In job	Work Experience In college	Similar work	Total
Continuing Education	11	4	4	10	11	12	11
Arts and Science	4	5	3	4	4	6	3.5
Nursing Education	6	2	5	7	7	3	7
Agriculture	2	2	1	5	5	10.5	10
Technical Trades	5	7	8	7	7	4	5.5
Library	9	6	6	11.5	9	7	8
Student Service	12	8	7	11.5	12	10.5	12
Counselling	6	2	2	7	7	9	3.5
Bursar's Office	3	12	12	1	1	2	2
Maintenance	1	11	11	3	3	1	1
Purchasing	6	9	9	2	2	5	5.5
Steno Pool	10	10	10	9	10	8	9

TABLE 23

Rank Order of Departments by the Seven Research Variables

Department	Technology		Structure		Organizational Effectiveness		
	Excep- tions	Search	Formal- ization	Exper- tise	Produc- tivity	Adapta- bility	Overall Effectiveness
Continuing Education	10	6	6.5	11	8	8	9
Arts and Science	9	3	10	6	10	11	11
Nursing Education	8	1	11	3	1	6	6.5
Agriculture	5.5	4.5	5	10	9	8	9
Technical Trades	5.5	4.5	4	12	1	4.5	4
Library	1	9	8	9	5.5	3	5
Student Services	3	8	6.5	8	4	4.5	6.5
Counselling	2	2	12	1	5.5	8	1
Bursar's Office	5.5	10	3	3	2	2	2
Maintenance	11.5	11	1	5	12	12	12
Purchasing	5.5	7	9	7	3	1	3
Steno Pool	11.5	12	2	3	7	10	9

for the Steno Pool tended to follow a similar pattern to that of Maintenance.

The rank order of mean scores on all three effectiveness variables for Arts and Science proved to be a rather surprising finding. Arts and Science was the second or third lowest of all departments in the college in terms of perceived effectiveness. On the other hand, respondents in the Bursar's Office perceived their effectiveness to be the second highest of all departments in the college on all three effectiveness variables. A similar finding occurred in the case of Purchasing with mean scores on all three effectiveness variables ranking either first or third highest in comparison to other departments in the college.

The next chapter in the study reports the results of testing the experimental hypotheses on the basis of departments in the college.

Chapter 6

RESEARCH FINDINGS RELATING TO DEPARTMENTS

Nine experimental hypotheses were derived from organizational theory as a means of exploring the relationships between and among the technology, structure and organizational effectiveness variables selected for use in this study. This chapter presents the research findings which resulted when the relationships between the technology and structural variables were examined at the departmental level on the basis of mean organizational effectiveness scores.

In order to test each of the experimental hypotheses, departmental mean scores on each of the seven research variables were calculated. A summary of departmental means scores is presented in Table 24. As discussed in the previous chapter, an examination of departmental means on the seven research variables revealed that there was little difference among these scores. In order to divide departments on the basis of high and low mean scores for the pair of independent variables identified in each of the experimental hypotheses, it was therefore necessary to make some rather arbitrary distinctions. As a result, the actual difference between departments with high Formalization and those with low Formalization, for example, was not that great. Nevertheless, it was still possible to explore the relationships identified in each of the experimental hypotheses using departments. It should be noted, however, that conclusions based on the findings should be viewed as rather tentative in nature.

TABLE 24

Departmental Mean Scores on Each of the Seven Research Variables

Department	n	TECHNOLOGY		STRUCTURE		ORGANIZATION EFFECTIVENESS		
		\bar{X} Excep- tions	\bar{X} Search	\bar{X} Formal- ization	\bar{X} Exper- tise	\bar{X} Produc- tivity	\bar{X} Adapt- ability	\bar{X} Overall Effectiveness
Continuing Education	13	3.69	3.02	2.65	3.30	4.03	3.78	4.00
Arts and Science	19	3.97	3.10	2.47	3.91	3.96	3.60	3.79
Nursing Education	6	3.98	3.98	2.23	4.17	4.56	4.00	4.17
Agriculture	4	4.00	3.05	2.67	3.33	4.00	3.78	4.00
Technical Trades	4	4.00	3.05	2.80	2.90	3.89	4.11	4.33
Library	7	4.24	2.35	2.59	3.43	4.33	4.12	4.29
Student Services	6	4.11	2.40	2.65	3.80	4.44	4.11	4.17
Counselling	4	4.17	3.32	1.87	4.37	4.33	3.78	4.75
Bursar's Office	3	4.00	2.34	2.91	4.17	4.55	4.17	4.67
Maintenance	12	2.92	2.19	3.22	4.11	3.67	3.54	3.58
Purchasing	4	4.00	2.47	2.53	3.83	4.50	4.54	4.50
Steno Pool	7	2.92	2.02	3.01	4.17	4.14	3.62	4.00

EXPERIMENTAL HYPOTHESIS 1

Experimental hypothesis 1 stated that organizational effectiveness would be higher when the emphasis on the two structural variables—Formalization and Expertise—varied inversely. Table 25 presents the mean scores on the effectiveness variables when departments were grouped on the basis of high and low scores on both Formalization and Expertise.

Findings

The research findings associated with experimental hypothesis 1 are presented in relation to a rank ordering of Productivity, Adaptability and Overall Effectiveness scores.

Productivity. The highest mean score on Productivity was found to be associated with low Formalization and low Expertise. The second highest mean Productivity score was obtained for departments with low Formalization and high Expertise. The next in rank order related to departments with high Formalization and low Expertise. The lowest mean Productivity score occurred in departments with high Formalization and high Expertise.

Adaptability. The highest mean Adaptability score was found to be associated with departments having low Formalization and low Expertise. The second highest mean score on Adaptability occurred in departments with high Formalization and low Expertise. The lowest mean Adaptability scores were almost identical for departments with low Formalization and high Expertise and those with high Formalization

TABLE 25

Productivity, Adaptability and Overall Effectiveness Scores for Departments
Classified According to High and Low Scores on Formalization and Expertise
N = 12

High					Low				
\bar{X} Form. = 3.05					\bar{X} Form. = 2.69				
\bar{X} Exp. = 4.15					\bar{X} Exp. = 3.33				
Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.	Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.
9	3	4.55	4.17	4.67	1	13	4.03	3.78	4.00
10	12	3.67	3.54	3.58	4	3	4.00	3.78	4.00
12	7	4.14	3.62	4.00	5	3	3.89	4.11	4.33
					7	6	4.44	4.11	4.17
Over-					Over-				
all	3	4.12	3.78	4.08	all	4	4.19	3.95	4.13
Rank Order	4	4	4	4	Rank Order	3	2	3	
Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.	Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.
2	19	3.96	3.60	3.79	6	7	4.33	4.12	4.29
3	6	4.56	4.00	4.17	11	4	4.50	4.54	4.50
8	4	4.33	3.78	4.75					
Over-					Over-				
all	3	4.28	3.79	4.24	all	2	4.42	4.33	4.40
Rank Order	2	3	3	2	Rank Order	1	1	1	1
\bar{X} Form. = 2.19					\bar{X} Form. = 2.56				
\bar{X} Exp. = 4.15					\bar{X} Exp. = 3.63				

High

Formalization

Low

and high Expertise.

Overall Effectiveness. The highest mean Overall Effectiveness score was obtained for departments with low Formalization and low Expertise. The second highest mean Overall Effectiveness score was found to be associated with departments having low Formalization and high Expertise. Next in rank order came departments with high Formalization and low Expertise. The lowest mean score on Overall Effectiveness was obtained for departments with high Formalization and high Expertise.

In overview, the findings suggest that effectiveness was highest on all three variables for departments with low Formalization and low Expertise. Conversely, effectiveness was lowest on all three variables for departments with high Formalization and high Expertise.

Discussion of the Findings

The findings tended to provide only marginal support for the inverse relationship between Formalization and Expertise posited in the experimental hypothesis. Effectiveness was perceived to be highest on all three variables when both Formalization and Expertise were perceived to be low which was contrary to what had been hypothesized. Effectiveness was perceived to be lowest when both Formalization and Expertise were high which is as hypothesized by implication at least.

An examination of the rank order of mean effectiveness scores tended to suggest that effectiveness was higher when there was low Formalization and either low or high Expertise.

As a result, experimental hypothesis 1 was only partially supported.

EXPERIMENTAL HYPOTHESIS 2

Experimental hypothesis 2 stated that organizational effectiveness would be higher when the emphasis on Formalization—a structural variable—and the number of Exceptions—a technology variable—varied inversely. Table 26 presents the mean scores on the effectiveness variables when departments were grouped on the basis of high and low scores on both Formalization and Exceptions.

Findings

The research findings associated with experimental hypothesis 2 are presented in relation to a rank ordering of Productivity, Adaptability and Overall Effectiveness scores.

Productivity. The highest mean Productivity score was obtained for departments with low Formalization and many Exceptions. The second highest mean Productivity score occurred in the case of departments with low Formalization and few Exceptions. Next in rank order came departments with high Formalization and many Exceptions. The lowest mean Productivity score was found to be associated with departments having high Formalization and few Exceptions.

Adaptability. The highest mean score on Adaptability occurred for departments with low Formalization and many Exceptions. The second highest mean score on Adaptability was obtained for departments with high Formalization and many Exceptions. Next in rank order came departments with low Formalization and few Exceptions. The lowest mean score on Adaptability was found to be associated with departments

having high Formalization and few Exceptions.

Overall Effectiveness. The highest mean score on Overall Effectiveness was obtained for departments with low Formalization and many Exceptions. The second highest mean score on Overall Effectiveness occurred in the case of departments with high Formalization and many Exceptions. Next in rank order came departments with low Formalization and few Exceptions. The lowest mean score on Overall Effectiveness was found to be associated with departments having high Formalization and few Exceptions.

In overview, the findings suggest that effectiveness was highest on all three variables for departments with low Formalization and many Exceptions. Effectiveness was lowest in departments with high Formalization and few Exceptions.

Discussion of the Findings

The findings tended to provide only marginal support for the inverse relationship between Formalization and Exceptions posited in experimental hypothesis 2. Effectiveness was perceived to be highest when Formalization was low and there were many Exceptions which was hypothesized to be the case. On the other hand, effectiveness was perceived to be lowest when there was high Formalization and few Exceptions which was contrary to what had been hypothesized.

An examination of the rank order of mean effectiveness scores tended to suggest that effectiveness was perceived to be higher when there were many Exceptions and either low or high Formalization or few Exceptions and low Formalization.

As a result, experimental hypothesis 2 was only partially supported.

EXPERIMENTAL HYPOTHESIS 3

Experimental hypothesis 3 stated that organizational effectiveness would be higher when the emphasis on Formalization—a structural variable—and the extent of the Search—a technology variable—varied inversely. Table 27 presents the mean scores on the effectiveness variables when departments were grouped on the basis of high and low mean scores on both Formalization and Search.

Findings

The research findings associated with experimental hypothesis 3 are presented in relation to a rank ordering of Productivity, Adaptability and Overall Effectiveness scores.

Productivity. The highest mean score on Productivity occurred for departments with low Formalization and minimal Search. The second highest mean Productivity score was obtained for departments with low Formalization and extensive Search. Next in rank order came departments with high Formalization and minimal Search. The lowest mean score on Productivity was found to be associated with departments having high Formalization and extensive Search.

Adaptability. The highest mean score on Adaptability was obtained for departments with low Formalization and minimal Search. The second highest mean Adaptability score occurred in the case of departments with high Formalization and extensive Search. Next in

TABLE 27

Productivity, Adaptability and Overall Effectiveness Scores for Departments
Classified According to High and Low Scores on Formalization and Search
N = 12

	Extensive				Search				Minimal			
	\bar{X} Form. = 2.70	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} Search = 3.04	\bar{X} Form. = 2.95	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} Search = 2.24	\bar{X} Form. = 2.56	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} Search = 2.41
Dept.	N			\bar{X} O.E.	Dept.	N		\bar{X} O.E.	Dept.	N		\bar{X} O.E.
1	13	4.03	3.78	4.00	7	6	4.44	4.11	4.17	4.17	4.17	4.17
4	3	4.00	3.78	4.00	9	3	4.55	4.17	4.67	4.67	4.67	4.67
5	3	3.89	4.11	4.33	10	12	3.67	3.54	3.58	3.58	3.58	3.58
Over-					12	7	4.14	3.62	4.00	4.00	4.00	4.00
all	3	3.97	3.89	4.11	Over-							
Rank Order	4	2	3.5		all	4	4.20	3.86	4.11	4.11	4.11	4.11
						3	3	3.5	3.5	3.5	3.5	3.5
Formalization												
Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.	Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.	Dept.	N	\bar{X} O.E.
2	19	3.96	3.60	3.79	6	7	4.33	4.33	4.29	6	7	4.29
3	6	4.56	4.00	4.17	11	4	4.50	4.54	4.50	11	4	4.50
8	4	4.33	3.78	4.75	Over-					Over-		
Over-					all	2	4.42	4.33	4.40	all	2	4.40
all	3	4.28	3.79	4.24	Rank Order	1	1	1	1	Rank Order	1	1
Rank Order	2	4	2									
\bar{X} Form. = 2.19			\bar{X} Search = 3.47		\bar{X} Form. = 2.56		\bar{X} Search = 2.41			\bar{X} Form. = 2.56		\bar{X} Search = 2.41

High

Formalization

Low

order came departments with high Formalization and minimal Search. The lowest mean score on Adaptability occurred in the case of departments with low Formalization and extensive Search.

Overall Effectiveness. The highest mean score on Overall Effectiveness occurred in the case of departments with low Formalization and minimal Search. The second highest mean score on Overall Effectiveness was obtained for departments with low Formalization and extensive Search. The lowest mean score on Overall Effectiveness was the same for departments with high Formalization and extensive Search and those with high Formalization and minimal Search.

In overview, these findings suggest that effectiveness was highest on all three variables when there was low Formalization and minimal Search. Some problems arose, however, in determining the characteristics of departments in which effectiveness was lowest.

Discussion of the Findings

The findings provided only marginal support for the inverse relationship between Formalization and Search posited in experimental hypothesis 3. Effectiveness was perceived to be highest when there was low Formalization and minimal Search which was contrary to what had been hypothesized. Some problems were encountered, however, in identifying the level of Formalization and Search associated with the lowest perceived effectiveness. There was a tendency for perceived effectiveness to be lower when there was high Formalization and either minimal or extensive Search.

An examination of the rank order of mean effectiveness scores

tended to suggest that effectiveness was perceived to be slightly higher when there was low Formalization.

As a result, experimental 3 was not supported.

EXPERIMENTAL HYPOTHESIS 4

Experimental hypothesis 4 stated that organizational effectiveness would be higher when the emphasis on Expertise—a structural variable—and the number of Exceptions—a technology variable—varied directly. Table 28 presents the mean scores on the effectiveness variables when departments were grouped on the basis of high and low mean scores on both Expertise and Exceptions.

Findings

The research findings regarding experimental hypothesis 4 are presented in relation to a rank ordering of Productivity, Adaptability and Overall Effectiveness scores.

Productivity. The highest mean score on Productivity was obtained for departments with high Expertise and many Exceptions. The second highest mean score on Productivity occurred with departments having low Expertise and many Exceptions. Next in rank order came departments with high Expertise and few Exceptions. The lowest mean score on Productivity occurred in the case of departments with low Expertise and few Exceptions.

Adaptability. The highest mean score on Adaptability was obtained in the case of departments with low Expertise and many Exceptions. Next in rank order came departments with low Expertise

TABLE 28

Productivity, Adaptability and Overall Effectiveness Scores for Departments
Classified According to High and Low Scores on Expertise and Exceptions
N = 12

Many				Few			
\bar{X} Exp. = 4.27				\bar{X} Exp. = 4.09			
		\bar{X} Exc. = 4.09				\bar{X} Exc. = 3.45	
Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	Dept.	N	\bar{X} Prod.	\bar{X} Adapt.
8	4	4.33	3.78	2	19	3.96	3.60
9	3	4.55	4.17	3	6	4.56	4.00
				10	12	3.67	3.54
				12	7	4.14	3.62
Over-				Over-			
all	2	4.44	3.98	all	4	4.08	3.69
Rank Order	1	2	1	Rank Order	3	4	4
\bar{X} O.E.				\bar{X} O.E.			
Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	Dept.	N	\bar{X} Prod.	\bar{X} Adapt.
4	3	4.00	3.78	1	13	4.03	3.78
5	3	3.89	4.11				4.00
6	7	4.33	4.12				
7	6	4.44	4.11				
11	4	4.50	4.54				
Over-				Over-			
all	5	4.23	4.13	all	1	4.03	3.78
Rank Order	2	1	2	Rank Order	4	3	3
\bar{X} O.E.				\bar{X} O.E.			
\bar{X} Exp. = 3.46				\bar{X} Exp. = 3.30			
\bar{X} Exc. = 4.07				\bar{X} Exc. = 3.69			

and few Exceptions. The lowest mean score on Adaptability was found to be associated with departments with high Expertise and few Exceptions.

Overall Effectiveness. The highest mean score on Overall Effectiveness was obtained for departments with high Expertise and many Exceptions. The second highest mean score on Overall Effectiveness occurred in the case of departments with low Expertise and many Exceptions. Next in rank order came departments with low Expertise and few Exceptions. The lowest mean score on Overall Effectiveness was obtained in the case of departments with high Expertise and few Exceptions.

In overview, the research findings would tend to indicate that effectiveness was highest when there was high Expertise and many Exceptions. Effectiveness tended to be lowest when there was high Expertise and few Exceptions.

Discussion of the Findings

The findings tended to provide only partial support for the direct relationship between Expertise and Exceptions posited in experimental hypothesis 4. Effectiveness was perceived to be higher on two of the three variables when there were many Exceptions and either high or low Expertise. Effectiveness was perceived to be lower when there were few Exceptions and either high or low Expertise.

An examination of the rank order of mean effectiveness scores tended to suggest that effectiveness was perceived to be higher when there were many Exceptions.

As a result, experimental hypothesis 4 was only partially supported.

EXPERIMENTAL HYPOTHESIS 5

Experimental hypothesis 5 stated that organizational effectiveness would be higher when the emphasis on Expertise—a structural variable—and the extent of Search—a technology variable—varied directly. Table 29 presents the mean score on the effectiveness variables when departments were grouped on the basis of high and low scores on both Expertise and Search.

Findings

The research findings regarding experimental hypothesis 5 are presented in relation to a rank ordering of Productivity, Adaptability and Overall Effectiveness scores.

Productivity. The highest mean score on Productivity was obtained for departments with low Expertise and minimal Search. The second highest mean score on Productivity was found to be associated with departments having high Expertise and extensive Search. Next in rank order came departments with high Expertise and minimal Search. The lowest mean score on Productivity occurred in the case of departments with low Expertise and extensive Search.

Adaptability. The highest mean score on Adaptability was obtained for departments with low Expertise and minimal Search. The second highest mean score on Adaptability occurred in the case of departments with low Expertise and extensive Search. The lowest mean

TABLE 29

Productivity, Adaptability and Overall Effectiveness Scores for Departments
Classified According to High and Low Scores on Expertise and Search
N = 12

Extensive					Search				
Minimal									
\bar{X} Exp. = 4.15					\bar{X} Search = 3.47				
Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.	Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} Search = 2.18
2	19	3.96	3.60	3.79	9	3	4.55	4.17	4.67
3	6	4.56	4.00	4.17	10	12	3.67	3.54	3.58
8	4	4.33	3.78	4.75	12	7	4.14	3.62	4.00
Over-all	3	4.28	3.79	4.24	Over-all	3	4.12	3.78	4.08
Rank Order		2	3	2	Rank Order		3	4	4
\bar{X} Exp. = 3.18					\bar{X} Search = 3.04				
Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.	Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.
1	13	4.03	3.78	4.00	6	7	4.33	4.12	4.29
4	3	4.00	3.78	4.00	7	6	4.44	4.11	4.17
5	3	3.89	4.11	4.33	11	4	4.50	4.54	4.50
Over-all	3	3.97	3.89	4.11	Over-all	3	4.42	4.26	4.32
Rank Order		4	2	3	Rank Order		1	1	1
\bar{X} Exp. = 3.69					\bar{X} Search = 2.41				

High

Expertise

Low

scores on Adaptability were almost identical for departments with high Expertise and extensive Search and those with high Expertise and minimal Search.

Overall Effectiveness. The highest mean score on Overall Effectiveness was obtained in the case of departments with low Expertise and minimal Search. The second highest mean score on Overall Effectiveness occurred in the case of departments with high Expertise and extensive Search. Next in rank order came departments with low Expertise and extensive Search. The lowest mean score on Overall Effectiveness was obtained for departments with high Expertise and minimal Search.

In overview, the research findings tended to suggest that effectiveness was highest on all three variables when there was low Expertise and minimal Search. Effectiveness tended to be lowest when there was high Expertise and minimal Search.

Discussion of the Findings

The research findings tended to support the direct relationship posited in experimental hypothesis 5. Perceived effectiveness tended to be higher when there was low Expertise and minimal Search or when there was high Expertise and extensive Search. Perceived effectiveness tended to be lower when these variables related inversely.

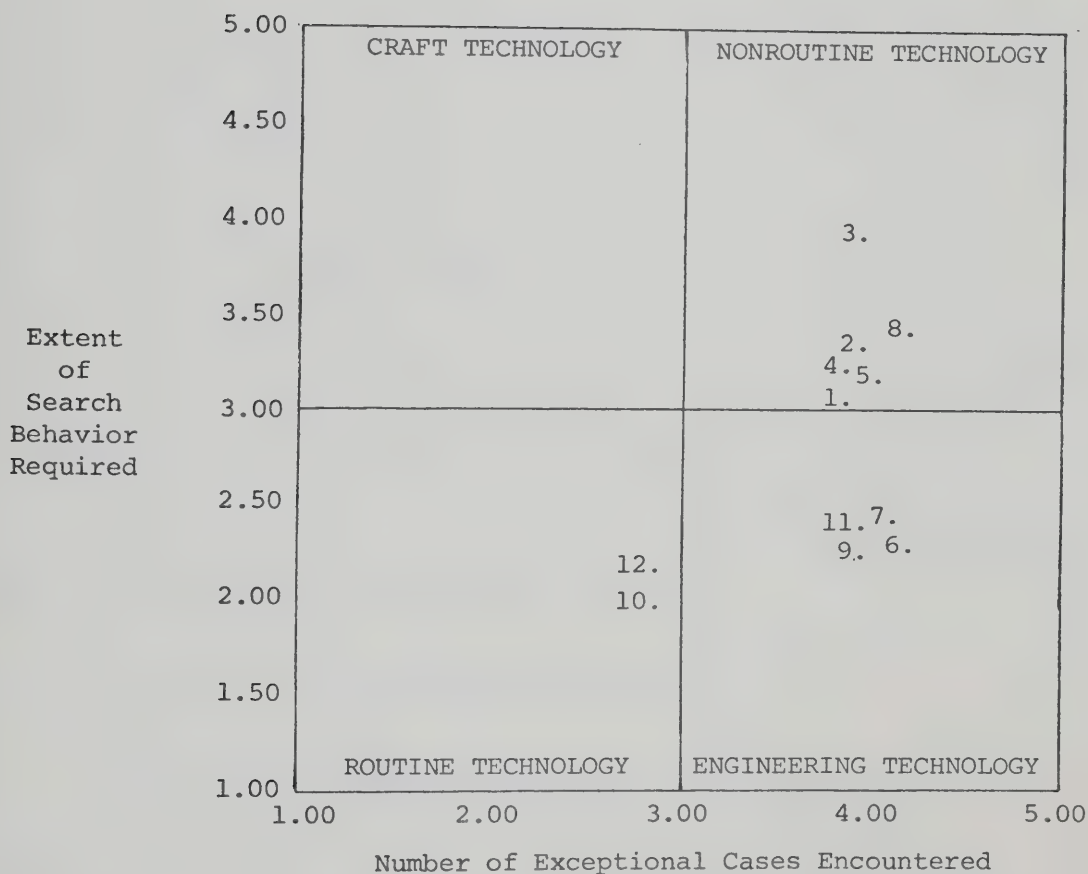
An examination of the rank order of mean effectiveness scores raised some interesting questions. While the ranking of effectiveness scores for departments located in three of the four cells tended to demonstrate a relatively consistent pattern, such was not the case

for departments with low Expertise and extensive Search. These departments ranked fourth on Productivity, second on Adaptability and third on Overall Effectiveness. Although it must be acknowledged that the actual differences in mean effectiveness scores were not that great, this kind of a pattern is difficult to interpret.

Overall, however, the findings appeared to support experimental hypothesis 5.

ARCHETYPAL TECHNOLOGIES OF THE TWELVE DEPARTMENTS

The last four experimental hypotheses related to the relationship between Formalization and Expertise, the two structural variables, on the basis of mean effectiveness scores in the context of the four archetypal technologies: Craft, Nonroutine, Engineering and Routine. In order to test these hypotheses, it was necessary to identify the archetypal technology of each department. Figure 9 presents the results when each department was located by plotting the mean scores of the departments on Exceptions and Search, the two technology variables. As indicated in Figure 8, three technology clusters were obtained. None of the twelve departments were found to have a Craft technology which meant that the related hypotheses could not be tested. Continuing Education, Arts and Science, Nursing Education, Agriculture, Technical Trades and Counselling were the six departments which were identified as having a Nonroutine technology. The Library, Student Services, the Bursar's Office and Purchasing were the four departments which were identified as having an Engineering technology. Maintenance and the Steno Pool were the two departments which were



- | | | |
|-------------------------|---------------------|--------------------|
| 1. Continuing Education | 5. Technical Trades | 9. Bursar's Office |
| 2. Arts and Science | 6. Library | 10. Maintenance |
| 3. Nursing Education | 7. Student Services | 11. Purchasing |
| 4. Agriculture | 8. Counselling | 12. Steno Pool |

Figure 9. Archetypal Technologies of the Twelve Departments in the Study

identified as having a Routine technology. According to the original research design, only those departments with mean scores on both technology variables which were in excess of .50 of a scale interval from the 3.00 midpoint were to be considered as having defensible, archetypal technologies. When it became apparent from Figure 8 that this would mean the elimination of all but five departments—Nursing Education, the Library, Student Services and Purchasing—the criteria for inclusion were changed so that departments with at least one mean score on a technology variable .50 of a scale interval away from the 3.00 midpoint could be considered. As a result, all twelve departments were considered to qualify for inclusion in testing the relationships between Formalization and Expertise on the basis of mean effectiveness scores in the context of their relevant archetypal technologies examined in this study.

EXPERIMENTAL HYPOTHESIS 6

Experimental hypothesis 6 was the first of a series of four hypotheses relating to the archetypal technologies identified by Perrow (1967:196). This hypothesis stated that, in departments with a Craft Technology, organizational effectiveness would be higher when there was low Formalization and high Expertise. As indicated in Figure 9 none of the twelve departments had a Craft technology. As a result, it was not possible to test experimental hypothesis 6 in the present study.

EXPERIMENTAL HYPOTHESIS 7

Experimental hypothesis 7 stated that, in departments with a Nonroutine technology, organizational effectiveness would be higher when there was low Formalization and high Expertise. Table 30 presents the mean effectiveness scores for the six departments with Nonroutine technologies divided on the basis of high and low scores on both Formalization and Expertise. As Table 30 indicates, the departments split evenly between two cells: low Formalization and high Expertise and high Formalization and low Expertise. None of the six departments were found to locate in either of the two remaining cells.

Findings

The research findings regarding experimental hypothesis 7 are presented in relation to a rank order of Productivity, Adaptability and Overall Effectiveness scores.

Productivity. Mean Productivity was found to be higher for departments with low Formalization and high Expertise than for departments in which this relationship was reversed.

Adaptability. Mean Adaptability was found to be higher for departments with high Formalization and low Expertise than for departments in which this relationship was reversed.

Overall Effectiveness. Mean Overall Effectiveness was found to be higher for departments with low Formalization and high Expertise than for departments in which this relationship was reversed.

TABLE 30

Productivity, Adaptability and Overall Effectiveness Scores for Departments with Nonroutine Technologies Classified According to High and Low Scores on Formalization and Expertise
N = 6

		High			Expertise			Low				
		Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.	\bar{X} Form. = 2.70	Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} Exp. = 3.18
High												
Formalization												
Low												
		\bar{X} Form. = 2.19			\bar{X} Exp. = 4.15							

In overview, the research findings would tend to suggest that, for departments with a Nonroutine technology, perceived effectiveness was higher on two of the three variables when there was low Formalization and high Expertise.

Discussion of the Findings

Recognizing that no departments located in two of the four cells, the research findings tended to support the relationship posited in experimental hypothesis 7. On the basis of two of the three effectiveness variables, effectiveness was higher when there was low Formalization and high Expertise. As a result, experimental hypothesis 7 was tentatively supported.

EXPERIMENTAL HYPOTHESIS 8

Experimental hypothesis 8 stated that, in departments with an Engineering technology, effectiveness would be higher when there was high Formalization and low Expertise. Table 31 presents the mean effectiveness scores for the four departments with an Engineering technology divided on the basis of high and low scores on both Formalization and Expertise. As Table 31 indicates, one department was located in the cell relating to high Formalization and high Expertise, one in the cell relating to high Formalization and low Expertise and two in the cell relating to low Formalization and low Expertise. None of the departments with an Engineering technology fell into the cell relating to low Formalization and high Expertise.

TABLE 31

Productivity, Adaptability and Overall Effectiveness Scores for Departments
with Engineering Technologies Classified According to High and Low
Scores on Formalization and Expertise

N = 4

Expertise									
High					Low				
\bar{X} Form. = 2.91		\bar{X} Exp. = 4.17			\bar{X} Form. = 2.65		\bar{X} Exp. = 3.80		
Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.	Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.
9	3	4.55	4.17	4.67	7	6	4.44	4.11	4.17
Over-all	1	4.55	4.17	4.67	Over-all	1	4.44	4.11	4.17
Rank Order	1	2		1	Rank Order	2	3		3
Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.	Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.
					6	7	4.33	4.12	4.29
					11	4	4.50	4.54	4.50
					Over-all	2	4.42	4.33	4.40
					Rank Order	3	1		2
\bar{X} Form. = 2.91		\bar{X} Exp. = 4.17			\bar{X} Form. = 2.56		\bar{X} Exp. = 3.63		

High

Formalization

Low

Findings

The research findings regarding experimental hypothesis 8 are presented in relation to a rank ordering of Productivity, Adaptability and Overall Effectiveness scores.

Productivity. The highest mean score on Productivity was obtained for the department with high Formalization and high Expertise. The next highest mean score on Productivity occurred in the case of a department with high Formalization and low Expertise. The lowest mean score on Productivity was obtained for departments with low Formalization and low Expertise.

Adaptability. The highest mean score on Adaptability occurred in the case of departments with low Formalization and low Expertise. The next highest mean score on Adaptability occurred in the case of the department with high Formalization and high Expertise. The lowest mean score on Adaptability was found to be associated with a department having high Formalization and low Expertise.

Overall Effectiveness. The highest mean score on Overall Effectiveness was obtained for the department with high Formalization and high Expertise. The next highest mean score on Overall Effectiveness occurred in the case of departments with low Formalization and low Expertise. The lowest mean score on Overall Effectiveness was found to be associated with the department having high Formalization and low Expertise.

In overview, the research findings tended to suggest that, in departments with an Engineering technology, effectiveness was highest

when there was high Formalization and high Expertise. Although the resolution is not clear, the findings tended to suggest that effectiveness was lowest when there was high Formalization and low Expertise.

Discussion of the Findings

The research findings did not appear to support the relationship posited in experimental hypothesis 8. Mean effectiveness was found to be the lowest on two of the three effectiveness variables for the department with high Formalization and low Expertise. Conversely, mean effectiveness was highest on two of the three variables for the department with high Formalization and high Expertise. Mean effectiveness scores in the cell relating to departments with low Formalization and low Expertise covered the full range; mean Productivity was highest, mean Adaptability was lowest and mean Overall Effectiveness was in the middle.

As a result of the findings, experimental hypothesis 8 was rejected.

EXPERIMENTAL HYPOTHESIS 9

Experimental hypothesis 9 stated that, in departments with a Routine technology, organizational effectiveness would be higher when there was high Formalization and low Expertise. Table 32 presents the mean score on the effectiveness variables for the two departments with Routine technology divided on the basis of high and low scores on both Formalization and Expertise. As indicated in Table 32, one department located in the cell relating to low Formalization and high Expertise while the other fell into the cell relating to high Formalization and

TABLE 32

Productivity, Adaptability and Overall Effectiveness Scores for Departments
with Routine Technologies Classified According to High and Low
Scores on Formalization and Expertise
N = 2

High Expertise Low

\bar{X} Form. = 3.22					\bar{X} Exp. = 4.11				
Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.	Dept.	N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.
10	12	3.67	3.54	3.58					
Over-									
all	1	3.67	3.54	3.58					
Rank Order	2	2	2	2					
Dept.					Dept.				
N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.		N	\bar{X} Prod.	\bar{X} Adapt.	\bar{X} O.E.	
12	7	4.14	3.62	4.00					
Over-									
all	1	4.14	3.62	4.00					
Rank Order	1	1	1	1					
\bar{X} Form. = 3.01					\bar{X} Exp. = 4.17				

High

Formalization

Low

high Expertise.

Findings

The research findings regarding experimental hypothesis 9 are presented in relation to a rank ordering of Productivity, Adaptability and Overall Effectiveness scores.

Productivity. Mean Productivity was higher for the department with low Formalization and high Expertise than for the department with high Formalization and high Expertise.

Adaptability. Mean Adaptability was higher for the department with low Formalization and high Expertise than it was for the department with high Formalization and high Expertise.

Overall Effectiveness. Mean Overall Effectiveness was higher for the department with low Formalization and high Expertise than it was for the department with high Formalization and high Expertise.

In overview, the research findings would tend to suggest that, for departments with a Routine technology, effectiveness was higher when there was low Formalization and high Expertise than when the reverse was the case.

Discussion of the Findings

It must be noted at the outset that, with only two departments involved, the results of this hypothesis testing are extremely tentative. Neither department was judged to fit the relationship stated in the experimental hypothesis as neither represented low Expertise. Had the department located in the upper left hand cell been placed in

the upper right hand cell on the basis that its mean score on Expertise was lower than that of the other department, the results would have been altered only in terms of the emphasis on Expertise which was associated with lower effectiveness.

As a result of these findings, experimental hypothesis 9 was rejected.

SUMMARY

This chapter presented the research findings which resulted when the nine experimental hypotheses were tested using the twelve departments as the unit of organization. It was noted from the outset that, because there was little difference among departmental mean scores on the seven research variables, the findings must be viewed as tentative in nature. In many cases, it was necessary to divide departments in terms of high and low scores on the dependent variables along somewhat arbitrary lines for the purposes of testing the relationships posited in the experimental hypotheses.

Table 33 is a summary of the findings in relation to each of the experimental hypotheses. Of the nine experimental hypotheses, two were supported by the data, three were only partially supported, one was not supported although there was some reason to believe that it could not be rejected in the present study, two hypotheses were rejected and no judgement could be made in the case of experimental hypothesis 6 because no data were obtained on which to test it.

Experimental hypothesis 1 stated that organizational effectiveness would be higher when the emphasis on Formalization and the

TABLE 33

Results of Testing the Experimental Hypotheses Using Departments

Experimental Hypothesis	Supported	Partially Supported	Not Supported	Rejected
1		X		
2		X		
3			X	
4		X		
5	X			
6		No Judgement		
7	X			
8				X
9				X

emphasis on Expertise varied inversely. The findings provided only partial support for the hypothesis. Effectiveness was perceived to be higher when there was low Formalization.

Experimental hypothesis 2 stated that organizational effectiveness would be higher when the emphasis on Formalization and the number of Exceptions varied inversely. The findings provided only partial support for the hypothesis. Effectiveness was perceived to be higher when there were many Exceptions.

Experimental hypothesis 3 stated that organizational effectiveness would be higher when the emphasis on Formalization and the extent of Search required varied inversely. The findings tended to not support the hypothesis but some problems were encountered in trying to determine what the alternative might be. There was a slight tendency for perceived effectiveness to be higher when there was low Formalization.

Experimental hypothesis 4 stated that organizational effectiveness would be higher when the emphasis on Expertise and the number of Exceptions encountered varied directly. The findings provided only partial support for the hypothesis. Effectiveness was perceived to be higher when there were many Exceptions.

Experimental hypothesis 5 stated that organizational effectiveness would be higher when the emphasis on Expertise and the extent of Search required varied directly. The findings supported this hypothesis. Effectiveness was perceived to be higher when the emphasis on Expertise was low and Search was minimal and when the emphasis on Expertise was high and the Search was extensive.

Experimental hypothesis 6 related to Craft technology but, because no data were obtained on which to test this hypothesis, no judgement could be made in the present study.

Experimental hypothesis 7 stated that, for departments with a Nonroutine technology, organizational effectiveness would be higher when there was low Formalization and high Expertise. Although no departments located in two of the four cells—those relating to high on both variables and those relating to low on both variables—the findings tended to provide support for the hypothesis. Effectiveness was perceived to be higher when there was low Formalization and high Expertise.

Experimental hypothesis 8 stated that, for departments with an Engineering technology, organizational effectiveness would be higher when there was high Formalization and low Expertise. Recognizing that only four departments were identified as having Engineering technologies and that no department located in the cell relating to low Formalization and high Expertise, the findings did not support the hypothesis. In fact, the findings indicated that effectiveness was perceived to be lowest when there was high Formalization and low Expertise. In the present study, departments with an Engineering technology perceived effectiveness to be higher when there was high Formalization and high Expertise or Low Formalization and low Expertise.

Experimental hypothesis 9 stated that, for departments with a Routine technology, organizational effectiveness would be higher when there was high Formalization and low Expertise. Recognizing that

only two departments were found to have Routine technologies and neither of these represented low Expertise, the findings did not support the hypothesis. Effectiveness was perceived to be higher when there was low Formalization and high Expertise.

Although the conclusions drawn from the research findings regarding each of the experimental hypotheses must be regarded as somewhat tentative in nature, some general trends emerged which may prove more substantial.

In the context of the first five experimental hypotheses, effectiveness tended to be perceived higher in relation to both low Formalization and to many Exceptions encountered. In almost every case, higher organizational effectiveness appeared to be associated with these levels of these factors almost without regard to the emphasis on Expertise or the extent of Search required.

In the context of the last four experimental hypotheses dealing with the archetypal technologies, perceived effectiveness tended to be higher in relation to low Formalization and high Expertise. In the cases of both Routine and Nonroutine technologies, departments with low Formalization and high Expertise tended to perceive higher organizational effectiveness than did departments with other combinations of these two structural variables.

The next chapter explores the experimental hypotheses in relation to individual respondent's perceptions of the relationships among the dependent and independent variables in each hypothesis.

Chapter 7

RESEARCH FINDINGS IN RELATION TO INDIVIDUAL RESPONDENTS

While it has already been acknowledged that units of organization are the usual data base upon which organizational theory is tested, there appeared to be some justification for testing the experimental hypotheses using individual respondent data. The data collected in the study were perceptual in nature. Respondents were asked to indicate their perceptions of the work technology, the organizational structure and the organizational effectiveness in their respective departments. If it is true that individuals behave in relation to what they perceive, then it should be possible to detect patterns of perceived relationships between and among variables using individual respondent data. As a result, it was decided to test the hypothesized relationships using individual respondent data to see if there was any support for the experimental hypotheses.

As indicated in Chapter 4, three research hypotheses were derived from each of the nine experimental hypotheses as a means of exploring the relationships between and among the technology, structure and organizational effectiveness variables. The first research hypothesis relating to each of the nine experimental hypotheses stated that there would be no significant interaction between the two independent variables identified when effectiveness was the dependent variable. The second and third research hypothesis in each set stated that there would be no significant main effect on the Factor A

and Factor B variables respectively when effectiveness was the dependent variable. Insofar as the independent variables were repeated in varying combinations, some of the research hypotheses relating to main effects were regarded as being somewhat redundant. For example, the structural variable, Formalization, appeared in each of the first three experimental hypotheses. While the first research hypothesis in each set was different insofar as it stated that there would be no significant interaction between Formalization and one of the other three independent variables in the study, the second research hypothesis in each of the first three sets was identical; that is, there would be no significant main effect on Formalization when effectiveness was the dependent variable. Because the same data were involved in each case, the same findings were expected. As a result, research findings in relation to research hypotheses 1.1, 2.2 and 3.2 were regarded as being somewhat redundant. A similar situation pertained to Expertise in relation to research hypotheses 1.3, 4.2 and 5.2; to Exceptions in relation to research hypotheses 2.3 and 4.3; and to Search in relation to research hypotheses 3.3 and 5.3. While the research findings are reported in relation to each of the twenty-seven research hypotheses derived from the nine experimental hypotheses, it should be noted that some of these findings are redundant.

SUMMARY OF RESEARCH FINDINGS RELATING TO RESEARCH HYPOTHESES 1.1 THROUGH 5.3

The two-way analysis of variance technique was employed to determine the relationship, if any, between the pair of independent variables identified in each of the experimental hypotheses when

effectiveness was the dependent variable. The findings relating to research hypothesis 1.1 through 5.3 are summarized in Tables 34 and 35.

Significant Interactions

Table 34 reports the significant interactions which were identified when research hypotheses 1.1, 2.1, 3.1, 4.1 and 5.1 were tested using two-way analysis of variance. As Table 34 indicates, only one interaction between pairs of independent variables was found to be significant at the .05 level. The interaction between Expertise and Search—research hypothesis 5.1—was found to be significant at the .05 level when Adaptability was the dependent variable.

TABLE 34

Summary of Significant Interactions Obtained
as a Result of Two-way Analysis of Variance
Tests of All Respondent Data

Interactive Variables	Effectiveness Variable	F-ratio	P	Research Hypothesis
Expertise-Search	Adaptability	8.53	.05	5.1

Significant Main Effects

Table 35 reports a summary of the main effects found to be significant at the .05 level when research hypotheses 1.2, 1.3, 2.2, 2.3, 3.2, 3.3, 4.2, 4.3, 5.2 and 5.3 were tested. As indicated in Table 35, main effects on Expertise and Exceptions were found to be significant at the .05 level when all three effectiveness measures

TABLE 35

Summary Table of Significant Main Effects Obtained on Variables as a Result of Two-way Analysis of Variance Tests Using All Respondent Data

Main Effect Variable	Other Variable	Effectiveness Variable	F-ratio	P	Research Hypothesis
Expertise	Formalization	Productivity	6.87	.01	1.3
Expertise	Formalization	Adaptability	8.49	.01	1.3
Expertise	Formalization	Overall	7.96	.01	1.3
		Effectiveness			
Exceptions	Formalization	Productivity	10.07	.01	2.3
Exceptions	Formalization	Adaptability	24.03	.001	2.3
Exceptions	Formalization	Overall	8.18	.01	2.3
		Effectiveness			
Expertise	Exceptions	Productivity	3.62	.05	4.2
Expertise	Exceptions	Adaptability	3.45	.05	4.2
Expertise	Exceptions	Overall	4.55	.05	4.2
		Effectiveness			
Exceptions	Expertise	Productivity	7.07	.01	4.3
Exceptions	Expertise	Adaptability	20.10	.001	4.3
Exceptions	Expertise	Overall	5.74	.05	4.3
		Effectiveness			
Expertise	Search	Productivity	6.68	.01	5.2
Expertise	Search	Adaptability	8.53	.01	5.2
Expertise	Search	Overall	7.63	.01	5.2
		Effectiveness			

were the dependent variables. It should be noted that no significant main effects on either Formalization or Search were obtained when effectiveness was the dependent variable.

SUMMARY OF RESEARCH FINDINGS RELATING TO RESEARCH HYPOTHESES 6.1 THROUGH 9.3

Research hypotheses 6.1 through 9.3 dealt with the relationship between the two structural variables, Formalization and Expertise, in the context of the four archetypal technologies when effectiveness was the dependent variable. Two data groupings were employed in testing the hypothesized relationships between Formalization and Expertise in the context of archetypal technologies. First, all respondents were grouped by department and data relating to respondents in departments with similar archetypal technologies were treated. Secondly, the archetypal technology of individual respondents was calculated and data relating to those with similar archetypal technologies were grouped for treatment irrespective of departmental affiliations.

Significant Interactions

As Table 36 indicates, only two interactions between Formalization and Expertise were found to be significant at the .05 level. A significant interaction between Formalization and Expertise was obtained for individuals who perceived their work to be Nonroutine technology when Adaptability was the dependent variable. A significant interaction between Formalization and Expertise was obtained for individuals who perceived their work to be Engineering technology

when Adaptability was the dependent variable.

TABLE 36

Summary Table of Significant Interactions between Formalization and Expertise as a Result of Two-way Analysis of Variance Tests in Relation to Archetypal Technologies

Respondent Group	N	Archetypal Technology	Effectiveness Variable	F-ratio	P
Individuals by Technology	24	Nonroutine	Adaptability	4.17	.05
Individuals by Technology	28	Engineering	Adaptability	5.51	.05

Significant Main Effects

Table 37 reports a summary of main effects found to be significant at the .05 level when the two-way analysis of variance technique was used to test research hypotheses 6.2, 6.3, 7.2, 7.3, 8.2, 8.3, 9.2 and 9.3. Of the five significant main effects obtained, four occurred in the context of Routine technology while the fifth was in relation to Nonroutine technology. Four of the five main effects obtained were on Formalization while the fifth was on Expertise. Two of the five main effects were obtained when Adaptability was the dependent variable while the remaining three occurred when Overall Effectiveness was the dependent variable. No significant main effects were obtained on either structural variable in the context of Engineering technology. Furthermore, no main effect on Formalization or Expertise was found to be significant when Productivity was the dependent variable.

TABLE 37

Summary Table of Significant Main Effects Obtained as a Result of Two-way Analysis of Variance Tests in the Context of the Four Archetypal Technologies

Respondent Group	N	Archetypal Technology	Main Effect Variable	Effectiveness Variable	F-ratio	P
Individuals by Department	19	Routine	Formalization	Adaptability	8.74	.01
Individuals by Department	19	Routine	Formalization	Overall Effectiveness	6.33	.05
Individuals by Technology	31	Routine	Formalization	Overall Effectiveness	3.83	.05
Individuals by Technology	31	Routine	Expertise	Overall Effectiveness	5.84	.05
Individuals by Department	43	Nonroutine	Formalization	Adaptability	8.09	.01

INTERPRETATION OF THE RESEARCH FINDINGS IN RELATION TO THE HYPOTHESES

This section presents an interpretation of the research findings in relation to both the research hypotheses and the experimental hypotheses from which they were derived.

For the purposes of this study, a significant interaction between a pair of independent variables when effectiveness was the dependent variable was taken as possible grounds for the rejection of the first research hypothesis in each set. For the purposes of this study, a significant main effect on an independent variable when effectiveness was the dependent variable was taken as possible grounds for the rejection of the related research hypothesis. A significant interaction or main effect obtained in relation to all three effectiveness variables was considered to be a sound basis upon which to reject the related research hypothesis. A significant interaction or main effect obtained in relation to two of the effectiveness variables was considered to be probable grounds upon which to base a rejection of the related research hypothesis. In cases where a significant interaction or main effect was obtained in relation to only one of the effectiveness variables, rejection of the related research hypothesis was subject to debate.

Research Hypothesis 1.1

Research hypothesis 1.1 stated that there would be no significant interaction between the two structural variables, Formalization and Expertise, when effectiveness was the dependent variable. No interaction significant at the .05 level was obtained between

Formalization and Expertise in relation to any of the three effectiveness variables.

Research Hypothesis 1.2

Research hypothesis 1.2 stated that there would be no significant main effect on Formalization when effectiveness was the dependent variable. No main effect on Formalization, significant at the .05 level, was obtained in relation to any of the three effectiveness variables.

Research Hypothesis 1.3

Research hypothesis 1.3 stated that there would be no significant main effect on Expertise when effectiveness was the dependent variable. A main effect on Expertise, significant at the .05 level, was obtained in relation to all three effectiveness variables.

Table 38 reports the results of a two-way analysis of variance test when Productivity was the dependent variable. Productivity scores were found to be higher when there was high Expertise, regardless of the emphasis on Formalization.

Table 39 reports the results of a two-way analysis of variance when Adaptability was the dependent variable. Adaptability scores were found to be higher when there was high Expertise, regardless of the emphasis on Formalization.

Table 40 reports the results of a two-way analysis of variance when Overall Effectiveness was the dependent variable. Overall Effectiveness scores were found to be higher when there was high Expertise, regardless of the emphasis on Formalization.

TABLE 38

Results of a Two-way Analysis of Variance Test on the
Relationship between Formalization and Expertise
When Productivity was the Dependent Variable

		Factor 'B' (Expertise)		
		High	Low	
Factor 'A' (Formalization)	High	n = 23 4.22	n = 24 3.97	Main Effect on Factor 'B' (Expertise) p = .01
	Low	4.29 n = 23	4.03 n = 27	

TABLE 39

Results of a Two-way Analysis of Variance Test on the
Relationship between Formalization and Expertise
When Adaptability was the Dependent Variable

		Factor 'B' (Expertise)		
		High	Low	
Factor 'A' (Formalization)	High	n = 23 3.91	n = 24 3.71	Main Effect on Factor 'B' (Expertise) p = .01
	Low	4.13 n = 23	3.75 n = 27	

TABLE 40

Results of a Two-way Analysis of Variance Test on the
 Relationship between Formalization and Expertise
 When Overall Effectiveness was the
 Dependent Variable

		Factor 'B' (Expertise)	
		High	Low
Factor 'A' (Formalization)	High	n = 23 4.22	n = 24 2.79
	Low	4.30 n = 23	3.96 n = 27

Main Effect on
 Factor 'B'
 (Expertise)
 $p = .01$

Discussion of the Research Findings

Research hypothesis 1.1 could not be rejected because no significant interaction between Formalization and Expertise was obtained when effectiveness was the dependent variable. Research hypothesis 1.2 could not be rejected because no significant main effect on Formalization was obtained when effectiveness was the dependent variable. Research hypothesis 1.3 could be rejected because a significant main effect on Expertise was obtained in relation to all three effectiveness variables. In the case of all three effectiveness variables, effectiveness scores were found to be higher when there was high Expertise regardless of the emphasis on Formalization. This meant that respondents who perceived a high emphasis on Expertise in their departments tended to perceive effectiveness to be high as well regardless of whether they perceived the emphasis on Formalization to be high or low.

Experimental hypothesis 1 stated that organizational effectiveness would be higher when the emphasis on Formalization and Expertise varied inversely. Insofar as no interaction significant at the .05 level was obtained between Formalization and Expertise when effectiveness was the dependent variable, the data did not appear to support experimental hypothesis 1. The discovery of the main effect on Expertise suggested that organizational effectiveness may be higher when there is high Expertise regardless of the emphasis on Formalization. The correlations between Expertise and all three effectiveness variables presented in Table 3 on page 74 suggested that there was a significant correlation between these variables.

It would appear that, for respondents in the community college studied, the higher the perceived emphasis on Expertise, the higher the perceived effectiveness regardless of the perceived emphasis on Formalization.

Research Hypothesis 2.1

Research hypothesis 2.1 stated that there would be no significant interaction between the structural variable, Formalization, and the technology variable, Exceptions, when effectiveness was the dependent variable. No interaction significant at the .05 level between Formalization and Exceptions was obtained in relation to any of the three effectiveness variables.

Research Hypothesis 2.2

Research hypothesis 2.2 stated that there would be no significant main effect on Formalization when effectiveness was the dependent variable. As was the case when research hypothesis 1.2 was tested, no main effect on Formalization significant at the .05 level was obtained in relation to any of the three effectiveness variables.

Research Hypothesis 2.3

Research hypothesis 2.3 stated that there would be no significant main effect on Exceptions when effectiveness was the dependent variable. A main effect on Exceptions significant at the .05 level was obtained in relation to all three effectiveness variables.

Table 41 reports the results of a two-way analysis of variance test when Productivity was the dependent variable. Productivity scores were found to be higher when there were many Exceptions

regardless of the emphasis on Formalization.

TABLE 41

Results of a Two-way Analysis of Variance Test on the Relationship between Formalization and Exceptions When Productivity was the Dependent Variable

		Factor 'B' (Exceptions)		
		Many	Few	
Factor 'A' (Formalization)	High	n = 19 4.32	n = 28 3.94	Main Effect on Factor 'B' (Exceptions) p = .01
	Low	4.23 n = 33	3.98 n = 17	

Table 42 reports the results of a two-way analysis of variance test when Adaptability was the dependent variable. Adaptability scores were found to be higher when there were many Exceptions regardless of the emphasis on Formalization.

Table 43 reports the results of a two-way analysis of variance test when Overall Effectiveness was the dependent variable. Overall Effectiveness scores were found to be higher when there were many Exceptions regardless of the emphasis on Formalization.

Discussion of the Research Findings

Research hypothesis 2.1 could not be rejected because no significant interaction between Formalization and Exceptions was obtained when effectiveness was the dependent variable. As was the case when

TABLE 42

Results of a Two-way Analysis of Variance Test on the
Relationship between Formalization and Exceptions
When Adaptability was the Dependent Variable

	Factor 'B' (Exceptions)		
	High	Low	
Factor 'A' (Formalization)	n = 19 4.16	n = 28 3.56	Main Effect on Factor 'B' (Exceptions) p = Beyond .001
	4.04 n = 33	3.69 n = 17	

TABLE 43

Results of a Two-way Analysis of Variance Test on the
Relationship between Formalization and Exceptions
When Overall Effectiveness was the
Dependent Variable

	Factor 'B' (Exceptions)		
	High	Low	
High	n = 19 4.32	n = 28 3.99	Main Effect on Factor 'B' (Exceptions) p = .01
Low	4.21 n = 33	3.94 n = 17	

research hypothesis 1.2 was tested, research hypothesis 2.2 could not be rejected because no significant main effect on Formalization was obtained when effectiveness was the dependent variable. Research hypothesis 2.3 could be rejected because a significant main effect on Exceptions was obtained in relation to all three effectiveness variables. In the case of all three effectiveness variables, effectiveness scores were found to be higher when there were many Exceptions regardless of the emphasis on Formalization. This meant that respondents who perceived they encountered many exceptional cases in the work technology of their departments tended to perceive effectiveness to be high regardless of whether they perceived the emphasis on Formalization to be high or low.

Experimental hypothesis 2 stated that organizational effectiveness would be higher when the emphasis on Formalization and the number of Exceptional Cases Encountered varied inversely. Insofar as no interaction significant at the .05 level was obtained between Formalization and Exceptions when effectiveness was the dependent variable, the data did not support experimental hypothesis 2. The discovery of a significant main effect on Exceptions suggested that organizational effectiveness may be higher when there are many Exceptional Cases Encountered regardless of the emphasis on Formalization. The correlation between Exceptions and all three effectiveness variables presented in Table 3 on page 74 suggested that there was a significant correlation between these variables. It would appear that, for respondents in the college studied, those who perceived many exceptional cases encountered in their departmental work also

perceived the effectiveness of their departments to be high regardless of the perceived emphasis on Formalization.

This was an interesting finding. A possible interpretation of this finding relates to the idea that people who perceive many Exceptions in their departmental work may see these exceptional cases as representative of variety and challenge in their jobs. College personnel are generally well educated and the correlation between Educational Level and Exceptions in Table 3 on page 74 indicated that these variables were significantly correlated. Perhaps well educated people require a reasonable number of exceptional cases in their work in order for them to feel challenged and motivated in the job. This matter will be dealt with further in the final chapter.

Research Hypothesis 3.1

Research hypothesis 3.1 stated that there would be no significant interaction between the structural variable, Formalization, and the technology variable, extent of Search Behaviour Required, when effectiveness was the dependent variable. No interaction significant at the .05 level between Formalization and Search was obtained in relation to any of the three effectiveness variables.

Research Hypothesis 3.2

Research hypothesis 3.2 stated that there would be no significant effect on Formalization when effectiveness was the dependent variable. As was the case when research hypotheses 1.2 and 2.2 were tested, no main effect on Formalization significant at the .05 level was obtained in relation to any of the three effectiveness variables.

Research Hypothesis 3.3

Research hypothesis 3.3 stated that there would be no significant main effect on Search when effectiveness was the dependent variable. No main effect on Search significant at the .05 level was obtained in relation to any of the three effectiveness variables.

Discussion of the Research Findings

Research hypothesis 3.1 should not be rejected because no significant interaction between Formalization and Search was obtained when effectiveness was the dependent variable. As was the case when research hypotheses 1.2 and 2.2 were tested, research hypothesis 3.2 could not be rejected because no significant main effect on Formalization was obtained when effectiveness was the dependent variable. Research hypothesis 3.3 could not be rejected because no significant main effect on Search was obtained when effectiveness was the dependent variable.

Experimental hypothesis 3 stated that organizational effectiveness would be higher when the emphasis on Formalization and the extent of Search Behaviour Required varied inversely. Insofar as no interaction significant at the .05 level between Formalization and Search was obtained when effectiveness was the dependent variable, the data did not support experimental hypothesis 3. In addition, no significant main effects on either Formalization or Search were obtained in relation to any of the three effectiveness variables. These findings, or lack of findings, made interpretation a difficult task.

An examination of the correlation matrix in Table 3 on page 74 gave some guidance. Neither Formalization nor Search were found

to correlate significantly with any of the three effectiveness variables. As a result, it was not surprising to find no interactive or main effect relationship when effectiveness was the dependent variable. Furthermore, experimental hypothesis 3 stated that organizational effectiveness would be higher when Formalization and Search varied inversely but these two variables were found to correlate significantly and positively which implied a direct rather than inverse relationship.

It would appear that, while no judgement regarding experimental hypothesis 3 can be made on the basis of the research findings, their correlation suggests they may vary directly and therefore experimental hypothesis 3 should be rejected. Clearly more research is indicated before such a judgement could be made.

Research Hypothesis 4.1

Research hypothesis 4.1 stated that there would be no significant interaction between the structural variable, Expertise, and the technology variable, number of Exceptional Cases Encountered, when effectiveness was the dependent variable. No interaction significant at the .05 level was obtained between Expertise and Exceptions in relation to any of the three effectiveness variables.

Research Hypothesis 4.2

Research hypothesis 4.2 stated that there would be no significant main effect on Expertise when effectiveness was the dependent variable. As was the case when research hypothesis 1.3 was tested, a significant main effect on Expertise was obtained in relation to

all three effectiveness variables.

Table 44 reports the results of a two-way analysis of variance test when Productivity was the dependent variable. Productivity scores were found to be higher when there was high Expertise as opposed to low Expertise.

TABLE 44

Results of a Two-way Analysis of Variance Test on the Relationship between Expertise and Exceptions When Productivity was the Dependent Variable

		Factor 'B' (Exceptions)		Main Effect on Factor 'A' (Expertise) p = .01
		Many	Few	
Factor 'A' (Expertise)	High	n = 31 4.31	n = 15 4.13	
	Low	4.19 n = 21	3.87 n = 30	Main Effect on Factor 'B' (Exceptions) p = .05

Table 45 reports the results of a two-way analysis of variance test when Adaptability was the dependent variable. Adaptability scores were found to be higher when there was high Expertise as opposed to low Expertise.

Table 46 reports the results of a two-way analysis of variance test when Overall Effectiveness was the dependent variable. Overall Effectiveness scores were found to be higher when there was high Expertise regardless of the number of Exceptional Cases Encountered.

TABLE 45

Results of a Two-way Analysis of Variance Test on the
Relationship between Expertise and Exceptions When
Adaptability was the Dependent Variable

		Factor 'B' (Exceptions)		
		Many	Few	
Factor 'A' (Expertise)	High	n = 31 4.13	n = 15 3.79	Main Effect on Factor 'A' (Expertise) p = Beyond .001
	Low	4.02 n = 21	3.52 n = 30	Main Effect on Factor 'B' (Exceptions) p = .05

TABLE 46

Results of a Two-way Analysis of Variance Test on the
Relationship between Expertise and Exceptions When
Overall Effectiveness was the
Dependent Variable

		Factor 'B' (Exceptions)		
		High	Low	
Factor 'A' (Expertise)	High	n = 31 4.29	n = 15 4.20	Main Effect on Factor 'A' (Expertise) p = .05
	Low	4.19 n = 21	3.67 n = 30	Main Effect on Factor 'B' (Exceptions) p = .05

Research Hypothesis 4.3

Research hypothesis 4.3 stated that there would be no significant main effect on Exceptions when effectiveness was the dependent variable. As was the case when research hypothesis 2.3 was tested, a main effect on Exceptions significant at the .05 level was obtained in relation to all three effectiveness variables.

Table 44 above reports the results of a two-way analysis of variance test when Productivity was the dependent variable. Productivity scores were found to be higher when there were many Exceptional Cases Encountered regardless of the emphasis on Expertise.

Table 45 above reports the results of a two-way analysis of variance test when Adaptability was the dependent variable. Adaptability scores were found to be higher when there were many Exceptional Cases Encountered regardless of the emphasis on Expertise.

Table 46 above reports the results of a two-way analysis of variance when Overall Effectiveness was the dependent variable. Overall Effectiveness scores were found to be higher when there were many Exceptional Cases Encountered as opposed to when there were few.

Discussion of the Research Findings

Research hypothesis 4.1 could not be rejected because no significant interaction between Expertise and Exceptions was obtained when effectiveness was the dependent variable. As was the case when research hypothesis 1.3 was tested, research hypothesis 4.2 could be rejected because a significant main effect on Expertise was obtained in relation to all three effectiveness variables. As was the case when research hypothesis 2.3 was tested, research hypothesis 4.3

could be rejected because a significant main effect on Exceptions was obtained in relation to all three effectiveness variables. Effectiveness scores were found to be higher when there was high Expertise and many Exceptional Cases Encountered. In relation to both Productivity and Adaptability, effectiveness scores were found to be higher when there were many Exceptional Cases Encountered regardless of the emphasis on Expertise.

Experimental hypothesis 4 stated that organizational effectiveness would be higher when the emphasis on Expertise and the number of Exceptional Cases Encountered varied directly. Insofar as no interaction significant at the .05 level was obtained between Expertise and Exceptions when effectiveness was the dependent variable, it appeared that the data did not support experimental hypothesis 4. The discovery of significant main effects on both Expertise and Exceptions in relation to all three effectiveness variables suggested that organizational effectiveness might be higher when there was high Expertise and many Exceptional Cases Encountered. This finding suggested that part of the relationship hypothesized between these variables in experimental hypothesis 4 was supported; that is, organizational effectiveness would be higher when there was high Expertise and many Exceptional Cases Encountered. In fact, an examination of Tables 44-46 revealed that effectiveness scores were lowest in the cell relating to low Expertise and few Exceptions. As a result, it was decided that experimental hypothesis 4 was partially supported.

Research Hypothesis 5.1

Research hypothesis 5.1 stated that there would be no significant interaction between the structural variable, Expertise, and the technology variable, extent of Search Behaviour Required, when effectiveness was the dependent variable. An interaction between Expertise and Search significant at the .05 level was obtained when Adaptability was the dependent variable.

Table 47 reports the results of a two-way analysis of variance test when Adaptability was the dependent variable. As indicated in Figure 10, the marginal mean scores relating to rows and columns tended to reveal that the interaction between Expertise and Search was ordinal in nature; that is, effectiveness scores tended to be higher when Expertise was high and the Search Behaviour Required was extensive and lower when Expertise was low and Search Behaviour Required was minimal.

Research Hypothesis 5.2

Research hypothesis 5.2 stated that there would be no significant main effect on Expertise when effectiveness was the dependent variable. As was the case when research hypotheses 1.3 and 4.2 were tested, a main effect on Expertise significant at the .05 level was obtained in relation to all three effectiveness variables.

Table 48 reports the results of a two-way analysis of variance test when Productivity was the dependent variable. Productivity scores were found to be higher when there was high Expertise regardless of the Extent of Search Behaviour Required.

Table 47 reports the results of a two-way analysis of variance

TABLE 47

Results of a Two-way Analysis of Variance Test on the Relationship between Expertise and Search When Adaptability was the Dependent Variable

		Factor 'B' (Search)			
		Extensive	Minimal		
Factor 'A' (Expertise)	High	n = 31 4.11	n = 15 3.94	3.86	Significant 'A B' Interaction p = .05
	Low	3.61 n = 26	3.85 n = 23	3.72	
		3.89	3.88	Main Effect on Factor 'A' (Expertise) p = .01	

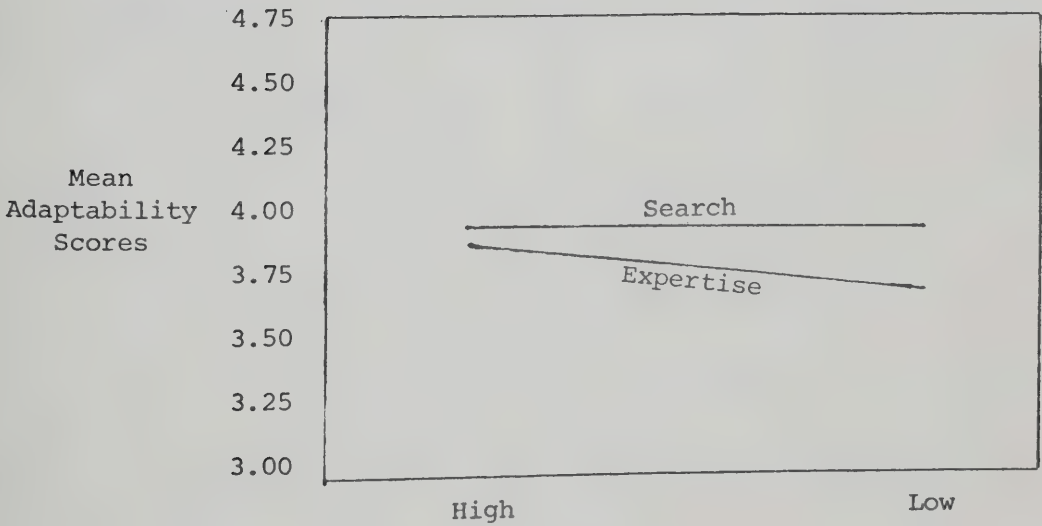


Figure 10 Relationship between Expertise and Search for All Respondents on the Basis of Marginal Means on Adaptability

TABLE 48

Results of a Two-way Analysis of Variance Test on the
Relationship between Expertise and Search When
Productivity was the Dependent Variable

		Factor 'B' (Search)		
		Extensive	Minimal	
Factor 'A' (Expertise)	High	n = 22 4.29	n = 24 4.22	Main Effect on Factor 'A' (Expertise) p = .91
	Low	3.92	4.08	

test when Adaptability was the dependent variable. Because a significant interaction between Expertise and Search was also obtained when Adaptability was the dependent variable, no interpretation of this finding could be given.

Table 49 reports the results of a two-way analysis of variance when Overall Effectiveness was the dependent variable. Overall Effectiveness scores were found to be higher when there was high Expertise regardless of the extent of Search Behaviour Required.

Research Hypothesis 5.3

Research hypothesis 5.3 stated that there would be no significant main effect on Search when effectiveness was the dependent variable. No main effect on Search significant at the .05 level was obtained in relation to any of the three effectiveness variables.

Discussion of the Research Findings

Although an interaction significant at the .05 level between Expertise and Search was obtained in relation to the effectiveness variable, Adaptability, research hypothesis 5.1 could not be rejected. The primary reason for not rejecting research hypothesis 5.1, even though a significant interaction was obtained, is that there was a significant main effect on Expertise in relation to all three effectiveness variables. As was the case when research hypotheses 1.3 and 4.2 were tested, research hypothesis 5.2 could be rejected because a significant main effect on Expertise was obtained in relation to all three effectiveness variables. Research hypothesis 5.3 could not be rejected because no significant main effect on Search was

TABLE 49

Results of a Two-way Analysis of Variance Test on the
Relationship between Expertise and Search When
Overall Effectiveness was the
Dependent Variable

		Factor 'B' (Search)		Main Effect on Factor 'A' (Expertise) p = .01
		Extensive	Minimal	
Factor 'A' (Expertise)	High	n = 22 4.27	n = 24 4.25	
	Low	3.77 n = 26	4.00 n = 25	

obtained in relation to any of the three effectiveness variables. Effectiveness scores were found to be higher when there was high Expertise regardless of the extent of Search Behaviour Required.

Experimental hypothesis 5 stated that organizational effectiveness would be higher when the emphasis on Expertise and the extent of Search Behaviour Required varied directly. Insofar as one significant, ordinal interaction between Expertise and Search was obtained in relation to Adaptability, there was some support for the experimental hypothesis. An examination of cell scores on Adaptability revealed that effectiveness tended to be higher when Expertise was high and Search Behaviour Required was extensive. On the other hand, effectiveness tended to be lowest when Expertise was low and Search Behaviour Required was extensive. The support for experimental hypothesis 5 was viewed as inconclusive however because of the significant main effect on Expertise obtained in relation to all three effectiveness variables. Although it was not possible to interpret the finding in relation to Adaptability because a significant interaction was also obtained, effectiveness scores tended to be higher when there was high Expertise regardless of the extent of Search Behaviour Required. This meant that respondents perceived effectiveness to be higher when they perceived the emphasis on Expertise in their departments to be high regardless of how extensive or minimal they perceived the Search Behaviour Required in their departmental work to be. As a result of these findings, it was decided that the data did not support experimental hypothesis 5.

Research Hypotheses 6.1 to 6.3

Research hypotheses 6.1 to 6.3 related to a Craft technology. As indicated in Figure 9 in Chapter 6, none of the twelve departments were found to have a Craft technology. Furthermore, when the archetypal technologies of individual respondents were calculated, insufficient data were obtained to permit testing of these research hypotheses.

Discussion

Insofar as insufficient data were obtained to test the related research hypotheses, no judgement could be made in the case of experimental hypothesis 6.

Research Hypothesis 7.1

Research hypothesis 7.1 stated that, in Nonroutine technologies, there would be no significant interaction between the two structural variables, Formalization and Expertise, when effectiveness was the dependent variable. An interaction significant at the .05 level was obtained between Formalization and Expertise when Adaptability was the dependent variable.

Table 50 reports the results of a two-way analysis of variance test for individuals who perceived their work to be Nonroutine technology when Adaptability was the dependent variable. As indicated in Figure 11, an examination of the marginal mean scores relating to rows and columns tended to reveal that the interaction between Formalization and Expertise was disordinal in nature; that is, Adaptability scores were higher for low Formalization than high Formalization

TABLE 50

Results of a Two-way Analysis of Variance Test on the Relationship between Formalization and Expertise When Adaptability was the Dependent Variable for Individuals who Perceived their Work To Be Nonroutine Technology

		Factor 'B' (Expertise)		
		High	Low	
Factor 'A' (Formalization)	High	n = 7 4.07	n = 5 3.57	3.86
	Low	4.07 n = 7	4.23 n = 5	4.14
		4.06	3.90	

Significant 'A B' Interaction
p = .05

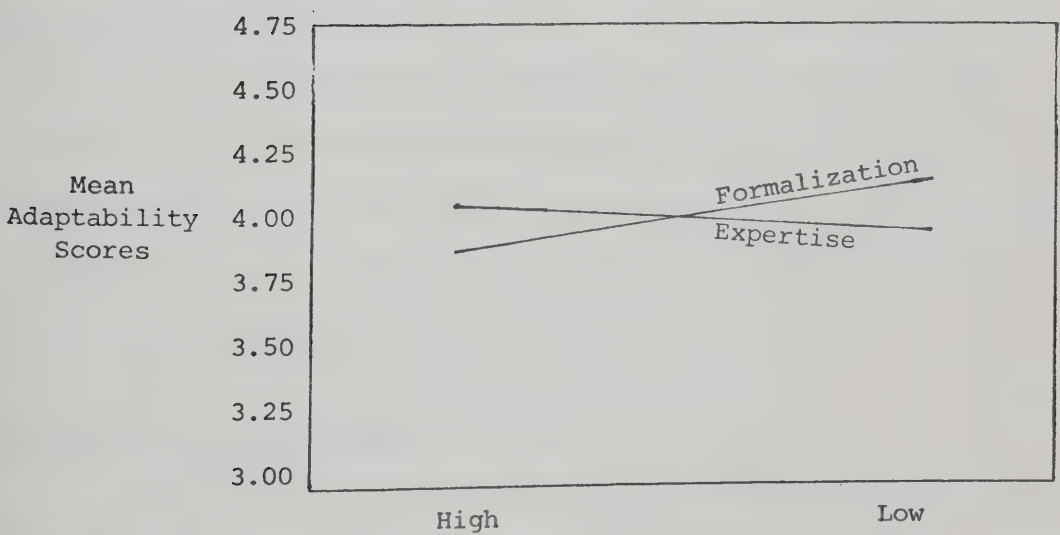


Figure 11 Relationship between Formalization and Expertise on the Basis of Marginal Mean Scores on Adaptability for Individuals who Perceived their Work To Be Nonroutine Technology

and higher for high Expertise than for low Expertise.

Research Hypothesis 7.2

Research hypothesis 7.2 stated that, in Nonroutine technologies, there would be no significant main effect on Formalization when effectiveness was the dependent variable. A main effect on Formalization significant at the .05 level was obtained in relation to the effectiveness variable, Adaptability.

Table 51 reports the results of a two-way analysis of variance test for individuals in departments having a Nonroutine technology when Adaptability was the dependent variable. Adaptability scores were found to be higher when there was low Formalization regardless of the emphasis on Expertise. No significant main effects were obtained in relation to either of the other two effectiveness variables however.

Research Hypothesis 7.3

Research hypothesis 7.3 stated that, in Nonroutine technologies, there would be no significant main effect on Expertise when effectiveness was the dependent variable. No main effect on Expertise significant at the .05 level was obtained in relation to any of the three effectiveness variables.

Discussion of the Research Findings

Research hypothesis 7.1 might be rejected on a qualified basis; that is, only for individuals who perceived their work to be Nonroutine technology when Adaptability was the dependent variable. Since the finding did not hold for the other two effectiveness

TABLE 51

Results of a Two-way Analysis of Variance Test on the
 Relationship between Formalization and Expertise
 When Adaptability was the Dependent Variable
 for Individuals in Departments having a
 Nonroutine Technology

		Factor 'B' (Expertise)	
		High	Low
Factor 'A' (Formalization)	High	n = 12 3.51	n = 7 3.50
	Low	4.12 n = 14	3.63 n = 10

Main Effect on
 Factor 'A'
 (Formalization)
 $p = .01$

variables it is open to debate whether or not this is sufficient evidence upon which to base a rejection of research hypothesis 7.1. As a result, no judgement could be made but the findings would suggest that this research hypothesis should not be rejected without further research. Research hypothesis 7.2 could be rejected only on a highly qualified basis as well; that is, only for individuals in departments having a Nonroutine technology when Adaptability was the dependent variable. Again, since the finding did not hold for the other two effectiveness variables, it is open to debate whether or not this is sufficient evidence upon which to base a rejection of research hypothesis 7.2. As a result, no judgement could be made but the findings would suggest that this research hypothesis should not be rejected without further research. Research hypothesis 7.3 could not be rejected because no significant main effect on Expertise was obtained in relation to any of the three effectiveness variables.

Experimental hypothesis 7 stated that, in Nonroutine technologies, organizational effectiveness would be higher when there was low Formalization and high Expertise. One significant, disordinal interaction was obtained between Formalization and Expertise when Adaptability was the dependent variable. When this finding was examined, there was some evidence to support the experimental hypothesis but it was far from conclusive. In addition to the one significant interaction, a significant main effect on Formalization was obtained when Adaptability was the dependent variable. Adaptability scores were found to be higher when there was low Formalization. Once again, however, this was hardly conclusive support for the

experimental hypothesis.

Insofar as the research findings were in the hypothesized directions, it would appear that experimental hypothesis 7 might be tentatively supported but only on a highly qualified basis as already indicated.

Research Hypothesis 8.1

Research hypothesis 8.1 stated that, in Engineering technologies, there would be no significant interaction between the structural variables, Formalization and Expertise, when effectiveness was the dependent variable. An interaction between Formalization and Expertise significant at the .05 level was obtained when Adaptability was the dependent variable.

Table 52 reports the results of a two-way analysis of variance test for individuals who perceived their work to be Engineering technology when Adaptability was the dependent variable. As indicated in Figure 12, an examination of the marginal mean scores relating to rows and columns tended to reveal that the interaction between Formalization and Expertise was disordinal in nature; that is, Adaptability scores were higher for high Formalization than they were for low Formalization and higher for low Expertise than they were for high Expertise. An examination of the Adaptability scores in the cells tended to reveal that effectiveness was higher when there was either high Formalization and high Expertise or low Formalization and low Expertise than when there were high-low combinations.

TABLE 52

Results of a Two-way Analysis of Variance Test on the Relationship between Formalization and Expertise When Adaptability was the Dependent Variable for Individuals who Perceived their Work To Be Engineering Technology

		Factor 'B' (Expertise)		
		High	Low	
Factor 'A' (Formalization)	High	n = 9 4.33	n = 7 4.05	
	Low	3.89 n = 6	4.30 n = 6	4.10
		4.15	4.17	

Significant 'A B' Interaction
p = .05

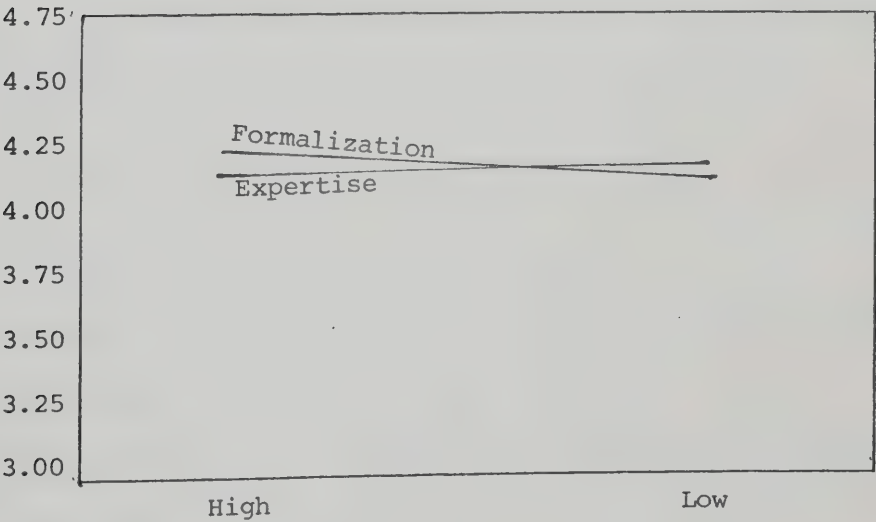


Figure 12 Relationship between Formalization and Expertise on the Basis of Marginal Mean Scores of Adaptability for Individuals who Perceived their Work To Be Engineering Technology

Research Hypothesis 8.2

Research hypothesis 8.2 stated that, in Engineering technologies, there would be no significant main effect on Formalization when effectiveness was the dependent variable. No main effect on Formalization significant at the .05 level was obtained in relation to any of the three effectiveness variables.

Research Hypothesis 8.3

Research hypothesis 8.3 stated that, in Engineering technologies, there would be no significant main effect on Expertise when effectiveness was the dependent variable. No main effect on Expertise significant at the .05 level was obtained in relation to any of the three effectiveness variables.

Discussion of the Research Findings

Research hypothesis 8.1 could be rejected on a highly qualified basis; that is, for individuals who perceived their work to be Engineering technology when Adaptability was the dependent variable. Since the finding did not hold for the other two effectiveness variables it is open to debate whether or not this is sufficient evidence upon which to base a rejection of research hypothesis 8.1. As a result, no judgement could be made but the finding suggested that this research hypothesis should not be rejected without further research. Research hypothesis 8.2 could not be rejected because no significant main effect on Formalization was obtained in relation to any of the three effectiveness variables. Research hypothesis 8.3 could not be rejected because no significant main effect on Expertise

was obtained in relation to any of the three effectiveness variables.

Experimental hypothesis 8 stated that, for Engineering technologies, organizational effectiveness would be higher when there was high Formalization and low Expertise. An examination of Adaptability scores in the case of the significant interaction obtained tended to reveal that Adaptability scores were highest when there was high Formalization and high Expertise and when there was low Formalization and low Expertise. This finding ran contrary to what had been hypothesized. Furthermore, this finding was similar to one made in the previous chapter in relation to departments. As a result, it was decided that experimental hypothesis 8 should be rejected.

Research Hypothesis 9.1

Research hypothesis 9.1 stated that, in Routine technologies, there would be no significant interaction between Formalization and Expertise when effectiveness was the dependent variable. No interaction between Formalization and Expertise significant at the .05 level was obtained in relation to any of the three effectiveness variables.

Research Hypothesis 9.2

Research hypothesis 9.2 stated that, in Routine technologies, there would be no significant main effect on Formalization when effectiveness was the dependent variable. A main effect on Formalization significant at the .05 level was obtained in relation to two of the three effectiveness variables.

Table 53 reports the results of a two-way analysis of variance

test for individuals in departments having a Routine technology when Adaptability was the dependent variable. Adaptability scores were found to be higher when there was low Formalization regardless of the emphasis on Expertise.

TABLE 53

Results of a Two-way Analysis of Variance Test on the Relationship between Formalization and Expertise When Adaptability was the Dependent Variable for Individuals in Departments having a Routine Technology

		Factor 'B' (Expertise)	
		High	Low
Factor 'A' (Formalization)	High	n = 6 3.31	n = 4 3.37
	Low	3.80 n = 5	3.88 n = 4

Main Effect on Factor 'A' (Formalization)
p = .01

Table 54 reports the results of a two-way analysis of variance test for individuals in departments having a Routine technology when Overall Effectiveness was the dependent variable. Overall Effectiveness scores were found to be higher when there was low Formalization regardless of the emphasis on Expertise.

Table 55 reports the results of a two-way analysis of variance test for individuals who perceived their work to be Routine technology when Overall Effectiveness was the dependent variable. Overall

TABLE 54

Results of a Two-way Analysis of Variance Test on the Relationship between Formalization and Expertise When Overall Effectiveness was the Dependent Variable for Individuals in Departments Having a Routine Technology

		Factor 'B' (Expertise)		
		High	Low	
Factor 'A' (Formalization)	High	n = 6 3.50	n = 4 3.25	Main Effect on Factor 'A' (Formalization) p = .05
	Low	4.40 n = 5	3.75 n = 4	

TABLE 55

Results of a Two-way Analysis of Variance Test on the Relationship between Formalization and Expertise When Overall Effectiveness was the Dependent Variable for Individuals who Perceived their Work To Be Routine Technology

		Factor 'B' (Expertise)		
		High	Low	
Factor 'A' (Formalization)		n = 6 4.00	n = 9 3.44	Main Effect on Factor 'A' (Formalization) p = .05
		4.43 n = 7	3.89 n = 9	Main Effect on Factor 'B' (Expertise) p = .05

Effectiveness scores were found to be higher when there was low Formalization as opposed to high Formalization.

Research Hypothesis 9.3

Research hypothesis 9.3 stated that, in Routine technologies, there would be no significant main effect on Expertise when effectiveness was the dependent variable. A main effect on Expertise significant at the .05 level was obtained when Overall Effectiveness was the dependent variable.

Table 55 above reports the results of a two-way analysis of variance test for individuals who perceived their work to be Routine technology when Overall Effectiveness was the dependent variable. Overall Effectiveness scores were found to be higher when there was low Formalization regardless of the emphasis on Expertise.

Discussion of the Research Findings

Research hypothesis 9.1 could not be rejected because no significant interaction between Formalization and Expertise was obtained in relation to any of the three effectiveness variables. Research hypothesis 9.2 could be rejected because significant main effects on Formalization were obtained in relation to both Adaptability and Overall Effectiveness. Respondents perceived effectiveness to be higher when they perceived the emphasis on Formalization to be low, in two out of three cases regardless of whether they perceived the emphasis on Expertise to be high or low. Research hypothesis 9.3 could be rejected on a highly qualified basis; that is, for individuals who perceived their work to be Routine technology

when Overall Effectiveness was the dependent variable. Overall Effectiveness scores were found to be higher in this case when there was high Expertise as opposed to low Expertise. This meant that respondents perceived the Overall Effectiveness to be higher when there was low Formalization and high Expertise.

Experimental hypothesis 9 stated that, in Routine technologies, organizational effectiveness would be higher when there was high Formalization and low Expertise. An examination of the data obtained in relation to significant main effects on both Formalization and Expertise tended to reveal that respondents perceived effectiveness to be higher when there was low Formalization and high Expertise. This finding was opposite to what had been hypothesized. The consistency of the finding, coupled with a similar finding reported in the previous chapter in relation to departments, suggested that there was evidence upon which to base a rejection of experimental hypothesis 9. As a result, experimental hypothesis 9 was rejected in the present study.

SUMMARY

This chapter presented the research findings relating to two-way analysis of variance testing of the research hypotheses using individual respondent data. While it was acknowledged from the outset that the primary test of organizational theory is the whole organization, or units within organization, there appeared to be some justification for testing the hypothesized relationships using individual respondent data. Insofar as the research findings reported

in this chapter tended to corroborate the research findings reported in the previous chapter in relation to departments, the justification for using individual respondent data was confirmed to some extent.

The major finding in this chapter related to the discovery that the structural variable, Expertise, and the technology variable, number of Exceptional Cases Encountered, were found to be related to the level of perceived effectiveness. When a significant main effect on Expertise was obtained, effectiveness scores were found to be higher when the emphasis on Expertise was high as opposed to when it was low. When a significant main effect on Exceptions was obtained, effectiveness scores were found to be higher when there were many Exceptional Cases Encountered as opposed to when there were few Exceptions. In testing the research hypotheses relating to the first five experimental hypotheses, no significant main effects on either Formalization or Search were obtained when effectiveness was the dependent variable. In testing research hypothesis relating to the last four experimental hypotheses which dealt with archetypal technologies, significant main effects on Formalization were obtained when effectiveness was the dependent variable. In this context, effectiveness scores were found to be higher when there was low Formalization as opposed to high Formalization.

Table 56 reports a summary of decisions made when the research findings were related to the research hypotheses and the experimental hypotheses from which they were derived. As noted at the beginning of this chapter, some of the research hypotheses relating to main effects on the independent variables were redundant. As a result,

TABLE 56

Summary of the Findings in Relation to the Research and Experimental Hypotheses

Research Hypothesis	Rejected	No Judgement	Not Rejected	Experimental Hypothesis
1.1 Interaction between Formalization and Expertise			X	1. Not supported
1.2 Main effect on Formalization			X	
1.3 Main effect on Expertise	X			
2.1 Interaction between Formalization and Exceptions			X	2. Not supported
2.2 Same as 1.2, 2.2 and 3.2			X	
2.3 Main effect on Exceptions	X			
3.1 Interaction between Formalization and Search			X	3. No judgement
3.2 Same as 1.2 and 2.2			X	
3.3 Main effect on Search			X	
4.1 Interaction between Expertise and Exceptions			X	4. Partially supported
4.2 Same as 1.3 and 5.2	X			
4.3 Same as 2.3	X			

TABLE 56 (Cont.)

Research Hypothesis	Rejected	No Judgement	Not Rejected	Experimental Hypothesis
5.1 Interaction between Expertise and Search	X			5. Not supported
5.2 Same as 1.3 and 4.2	X			
5.3 Same as 4.3			X	
6.1 Interaction between Formalization and Expertise in a Craft Technology		X		6. No judgement
6.2 Main effect on Formalization in a Craft Technology		X		
6.3 Main effect on Expertise in a Craft Technology		X		
7.1 Interaction between Formalization and Expertise in a Nonroutine Technology		X		7. Tentative support
7.2 Main effect on Formalization in a Nonroutine Technology		X		
7.3 Main effect on Expertise in a Nonroutine Technology			X	

TABLE 56 (Cont.)

Research Hypothesis	Rejected	No Judgement	Not Rejected	Experimental Hypothesis
8.1 Interaction between Formalization and Expertise in an Engineering Technology		X		8. Rejected
8.2 Main effect on Formalization in an Engineering Technology			X	
8.3 Main effect on Expertise in an Engineering Technology			X	
9.1 Interaction between Formalization and Expertise in a Routine Technology			X	9. Rejected
9.2 Main effect on Formalization in a Routine Technology	X			
9.3 Main effect on Expertise in a Routine Technology		X		

redundant research hypotheses have been identified with "Same as . . ." in order to avoid the impression that these were different research hypotheses.

It should be borne in mind that the data obtained in this study posed some definite limitations in the research. As a result, the decisions to reject or not reject the research hypotheses and the decisions to support or not support the experimental hypotheses had to be made under less than ideal conditions at times; that is, the empirical evidence was often far from conclusive as to which decision should be made in a number of cases.

Insofar as the study was intended to be exploratory regarding the intraorganizational relationships between and among the technology, structure and effectiveness variables, some insights have been gained regarding the nature of these relationships. It cannot be stressed strongly enough, however, that the findings of this study require further investigation before they could be viewed as anything more than those which resulted from a case study conducted in one Alberta community college.

Chapter 8

SUMMARY, CONCLUSIONS, IMPLICATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

This chapter is divided into four sections: (1) summary of the study and its findings, (2) conclusions, (3) implications, and (4) suggestions for further study and research.

SUMMARY OF THE STUDY

Purpose and Problems of the Study

The purpose of the study was to explore the intraorganizational relationship between organizational effectiveness and the selected organization characteristics of technology and structure in a post-secondary institutional setting.

The main research problem in this study was: What is the relationship between organizational effectiveness, organizational structure and technology in a post-secondary institution?

In order to answer the question posed in the research problem, it was necessary to seek answers to the following subproblems:

1. What is the relationship between organizational effectiveness and organizational structure?
2. What is the relationship between organizational effectiveness and technology?
3. What is the relationship between organizational structure and technology?
4. What is the relationship between organizational

effectiveness and the interaction between technology and organizational structure?

Focus of the Study

The study was focused on the intraorganization or departmental level of a community college in Alberta. The work of such people as Hall (1969), Magnusen (1972) and Lynch (1973) had suggested that there could be important intraorganizational differences in both the structure and the technology of larger organizations. This study was concerned with identifying and investigating such intraorganizational differences in a community college.

Justification for the Study

The study was justified on two grounds. First, there was a need to explore the concepts of technology, structure and effectiveness, and the relationships between and among them, in the context of service organizations such as educational institutions. Secondly, it was felt that post-secondary institutions could be more effective than they were at present. By exploring the relationships between and among technology, structure and effectiveness, some leads might be gained which would assist post-secondary institutions in achieving higher levels of effectiveness. One approach would be to ascertain if there were matches between technology and structure which, according to such people as Woodward (1965), Likert (1967), Thompson (1967) and Perrow (1970), have an effect upon organizational effectiveness.

Hypotheses for Research

Using a facet design approach, nine experimental hypotheses

were generated regarding the relationship between technology and structural variable when effectiveness was the dependent variable. The first experimental hypothesis dealt with the relationship between the two structural variables, Formalization and Expertise, when effectiveness was the dependent variable. The next four experimental hypotheses dealt with the relationship between four combinations of structural and technology variables when effectiveness was the dependent variable. The last four experimental hypotheses dealt with the relationship between Formalization and Expertise when effectiveness was the dependent variable in the context of the four archetypal technologies: Craft, Nonroutine, Engineering and Routine.

In order to test the experimental hypotheses, three research hypotheses relating to each experimental hypothesis were generated. The first research hypothesis in each set stated that there would be no significant interaction between the pair of independent variables identified when effectiveness was the dependent variable. The second and third research hypotheses in each set stated that there would be no significant main effect on either of the independent variables when effectiveness was the dependent variable.

Respondents in the Study

The respondents in the study were all fulltime staff members who were engaged in the principal task or tasks of those departments in a community college which had a minimum of four fulltime personnel. On this basis, fourteen departments were identified as suitable for use in this study. Sufficient data were obtained from twelve of the fourteen departments for them to be used as the basic units of

organization in this study.

Instrument Selection and Development

A structural inventory developed by MacKay (1964) and an organizational effectiveness instrument developed by Mott (1972) were judged to be both valid and reliable for use in this study. The technology instrument was developed for the present study and refined in the pilot study which was described in Chapter 4.

Factor analysis techniques were used to check the construct validity of the technology, structure and effectiveness instruments used in the study. Factor analysis of the technology instrument tended to suggest that the items loaded on one or the other of the two factors of Exceptions and Search as designed. Factor analysis of the structural inventory revealed that this instrument was not as factorially pure as Kolesar (1967) suggested in his study. After dropping items which did not load sufficiently on the two factors of Authority and Expertise, a second factor analysis suggested that the selected items were now more factorially pure. An examination of the items relating to the "Authority" factor resulted in the factor label being changed to Emphasis on Formalization. Insofar as this did not appear to violate the facet design or the experimental hypotheses generated from it, the study was conducted as planned after substituting the Formalization label for the Authority label whenever the latter appeared.

Factor analysis of the effectiveness instrument data revealed that the items loaded on the two factors of Productivity and Adaptability as designed. Item 10, which was an estimate of overall

effectiveness, correlated highly with the Productivity and Adaptability subscales. As a result, this became the third effectiveness variable in the study.

A correlation coefficient matrix involving the eleven continuous demographic variables and the seven research variables was created. An examination of this correlation matrix revealed that there were few significant correlations between demographic and research variables. Age was found to correlate with Formalization which meant that the older an individual was, the more likely it was that he would perceive Formalization to be high. Educational level and highest educational certification attained were found to correlate significantly with Exceptions, Search and Formalization. In the cases of Exceptions and Search, the more education an individual had undertaken, the higher the Exceptions and the more extensive the Search. In the case of Formalization, the more education undertaken, the lower the perceived emphasis on Formalization. The only other correlation between a demographic and a research variable occurred in the case of years in the present job and Expertise. In this case, the more years spent in the present job, the higher the perceived emphasis on Expertise.

In examining the correlations between research variables, several interesting findings were made. Exceptions and Search were found to correlate significantly which suggested that these technology variables were related. Exceptions correlated significantly but negatively with Formalization. In this case, the higher the Exceptions, the lower the emphasis on Formalization. On the other hand,

Search correlated positively with Formalization. This finding suggested that the more extensive the Search, the higher the Formalization. The correlation between Formalization and Expertise was low but significant which suggested that these two structural variables were largely independent of each other. Formalization did not correlate with any of the effectiveness variables. Expertise, however, was found to correlate positively with both Productivity and Overall Effectiveness. Similarly, Exceptions was found to correlate positively with all three effectiveness variables while Search correlated with none. Of the three effectiveness variables, all three were found to correlate highly with each other which suggested that they were highly related.

Data Collection

Data were collected from fulltime members of departments in Lethbridge Community College during the third week in November. The primary means of data collection was a four-part questionnaire which is contained in Appendix C.

Part I - Personal data. Part I collected data from respondents on eleven personal or demographic variables such as sex, age, educational background, highest educational certification attained, the division and department in which the respondent worked, job title and four work experience variables: (1) years in present job, (2) years in the college, (3) years doing similar work, and (4) total work experience since leaving high school. Respondent data consisted of checking off appropriate categories or filling in requested

information.

Part II - Technology. Part II consisted of fourteen items relating to the technology of the work which each respondent did in his or her department. Respondents were asked to react to each statement by circling the most appropriate of the five response categories which ran from Strongly Agree to Strongly Disagree.

Part III - Structural Inventory. Part III consisted of forty-six items relating to bureaucratic structure. Respondents were asked to react to each statement in relationship to their respective departments by circling the most appropriate of the five response categories which ran from Definitely True to Definitely False.

Part IV - Organizational Effectiveness. Part IV of the questionnaire was composed of ten items which sought respondents' perceptions of the organizational effectiveness of their respective departments. Respondents were asked to react to each item by circling the most appropriate of five response categories. Although the response categories were worded specifically in relation to each item, they ran in a general pattern from Highly Ineffective to Highly Effective.

Some interview data were collected from a number of college personnel. The primary purpose of these data was to describe the college. A secondary purpose was to gather information to assist in checking the validity of the instruments used. The planned interview schedule was disrupted mid-way through the data collection week due to the unexpected dismissal of the college president and the attendant

difficulties which arose as a result.

Data Treatment

Questionnaire data were coded onto computer cards for analysis. Data from Part I were coded using a numerical assignment for each response category. Data collected in Part II on technology were coded using "1" for responses which indicated either few Exceptions or minimal Search on up to "5" for either many Exceptions or extensive Search. Data collected with the structural inventory in Part III were coded using "1" for nonbureaucratic responses on up to "5" for highly bureaucratic responses on the items. Data collected in Part IV relating to organizational effectiveness were coded using "1" for low effectiveness on up to "5" for high effectiveness.

The first data treatment involved the calculation of frequencies and percentage distributions of responses on all items in the questionnaire.

In order to check the construct validity of the technology, structure and effectiveness instruments, a factor analysis technique was used. As a result of the findings, it was possible to refine the variable subscales which were to be employed in subsequent analyses.

In order to test the nine experimental hypotheses in relation to departments, departments were divided on the basis of high and low scores on the pair of independent variables identified in each hypothesis. Mean effectiveness scores obtained in the four cells were then examined to see if the hypothesized relationships between the pair of independent variables in each hypothesis were supported

by the data.

In order to test the research hypotheses which were derived from the nine experimental hypotheses, two-way analysis of variance tests were performed on individual respondent data. Two-way analysis of variance tests permitted the investigation of potential interactive relationships between pairs of independent variables when effectiveness was the dependent variable. In addition, two-way analysis of variance tests permitted the investigation of potential significant main effects of independent variables when effectiveness was the dependent variable.

In testing the research hypotheses derived from each of the first five experimental hypotheses data from all respondents were used. These data were then grouped by high and low scores on both of the independent variables identified in the hypotheses.

In testing the research hypotheses derived from each of the last four experimental hypotheses relating to archetypal technologies, two data groupings were used. First, respondents were grouped by department. Respondent data from departments with similar archetypal technologies were then divided on the basis of high and low scores on the two structural variables, Formalization and Expertise. The second data grouping related to all respondents irrespective of departmental affiliation. In this case, the archetypal technology of each individual was identified. Those with similar archetypal technologies were then divided on the basis of high and low scores on Formalization and Expertise. Two-way analysis of variance was then used in order to ascertain whether or not there were significant

interactions or main effects on Formalization and Expertise when effectiveness was the dependent variable for respondent groups with similar archetypal technologies.

In relating the research findings to the research hypotheses, significant interactions and main effects were taken as grounds for the possible rejection of the related research hypotheses. Significant interactions or main effects in relation to all three effectiveness variables were viewed as a more conclusive basis for rejection of the null hypotheses than was the case when the interactions or main effects were obtained in relation to only one or two effectiveness variables. The research findings were then related to the experimental hypotheses from which the research hypotheses had been derived in attempts to ascertain whether or not the findings supported the experimental hypotheses.

Description of Respondents and College Departments

Sufficient data were collected from twelve of the fourteen departments in the college to warrant their consideration in the hypothesis testing. Frequencies and percentage distributions of responses on each of the demographic and research variables were presented in table form in Chapter 5 as a means of describing the respondents and the departments studied.

While it was originally planned to use a one-way analysis of variance test to determine if differences between departmental mean scores on the demographic and research variables were significant, this plan was abandoned when it became apparent that the numbers

involved in many of the departments were too small to make the results of such testing particularly meaningful. Instead, departmental mean scores on the research variables were placed in descending rank order and reported in table form. As noted in Chapter 5, the range of departmental mean scores on the seven research variables was little more than one scale interval from top to bottom. Ideally, a greater range of departmental mean scores would have been obtained but this was not the case. As a result, it was decided that departments would be described in terms of their rank order on each of the research variables instead.

Some trends appeared to emerge. Continuing Education was high on both technology variables but the lowest on Formalization and the highest on Expertise. Maintenance was the low on both technology variables, high on both structural variables but the lowest of all twelve departments on all three effectiveness variables. The Steno Pool tended to follow a similar pattern.

The rank order of Arts and Science on all three technology variables was interesting. Arts and Science was second or third lowest of all twelve departments on all three effectiveness variables. On the other hand, the Bursar's Office was second highest of all departments on all three effectiveness variables.

While the range of mean scores was not that great, there appeared to be internal variation in the pattern of relationships among the seven research variables among the twelve departments.

Summary of Research Findings in Relation to Departments

In order to test the experimental hypotheses in relation to departments, departments were grouped on the basis of high and low mean scores on the pair of variables identified in each of the experimental hypotheses. Mean scores on each of the three effectiveness variables were then calculated for each cell. Mean effectiveness scores were placed in rank order and these findings compared to the relationship predicted in each of the experimental hypotheses. The following is a summary of the research findings in relation to each of the experimental hypotheses.

Experimental hypothesis 1. Experimental hypothesis 1 stated that organizational effectiveness would be higher when the emphasis on the two structural variables, Formalization and Expertise, varied inversely. Effectiveness was found to be highest on all three variables in departments with low Formalization and low Expertise. Effectiveness was found to be lowest on all three variables in departments with high Formalization and high Expertise. In addition, effectiveness was found to be higher when there was low Formalization regardless of the emphasis on Expertise. As a result of these findings, it appeared that the data provided only partial support for experimental hypothesis 1. The discovery that effectiveness tended to be higher when there was low Formalization suggested that this hypothesis required further investigation before it could be accepted or rejected.

Experimental hypothesis 2. Experimental hypothesis 2 stated that organizational effectiveness would be higher when the emphasis on Formalization, a structural variable, and the number of Exceptions, a technology variable, varied inversely. Effectiveness was found to be highest in departments with low Formalization and many Exceptions. Effectiveness was found to be lowest in departments with high Formalization and few Exceptions. In addition, effectiveness was found to be higher in departments where the technology involved many Exceptions. As a result of these findings, it appeared that the data provided only partial support for experimental hypothesis 2. The discovery that effectiveness tended to be higher when there were many Exceptions suggested that this hypothesis required further investigation before it could be accepted or rejected.

Experimental hypothesis 3. Experimental hypothesis 3 stated that organizational effectiveness would be higher when the emphasis on Formalization, a structural variable, and the extent of Search, a technology variable, varied inversely. Effectiveness was found to be highest on all three variables in departments with low Formalization and minimal Search. The inconsistent pattern of the rank order of the effectiveness variables in the other cells made it difficult to identify in which departments effectiveness was lowest. There was a suggestion in this pattern, however, that effectiveness tended to be higher when there was low Formalization. With the exception of Adaptability scores in the cell relating to departments with low Formalization and extensive Search, effectiveness tended to be higher when there was low Formalization. As a result of these findings, it

appeared that the data provided little support for experimental hypothesis 3. It was decided that experimental hypothesis 3 should be rejected.

Experimental hypothesis 4. Experimental hypothesis 4 stated that organizational effectiveness would be higher when the emphasis on Expertise, a structural variable, and the number of Exceptions, a technology variable, varied directly. Effectiveness was found to be highest on two of the three measures in departments with high Expertise and many Exceptions. Effectiveness was found to be lowest on two of the three variables in departments with high Expertise and few Exceptions. In addition, effectiveness tended to be higher in departments with many Exceptions regardless of the emphasis on Expertise. Once more, the findings provided only partial support for the experimental hypothesis. The discovery that effectiveness tended to be higher when there were many Exceptions suggested that this hypothesis required further testing before it could be accepted or rejected.

Experimental hypothesis 5. Experimental hypothesis 5 stated that organizational effectiveness would be higher when the emphasis on Expertise, a structural variable, and the extent of Search, a technology variable, varied directly. Effectiveness was found to be highest on all three variables in departments with low Expertise and minimal search. Effectiveness was found to be lowest in departments with high Expertise and minimal Search. The findings appeared to support the experimental hypothesis and, as a result, experimental hypothesis 5 was tentatively accepted.

Experimental hypothesis 6. Experimental hypothesis 6 stated that, in departments with a Craft technology, organizational effectiveness would be higher when there was low Formalization and high Expertise. None of the twelve departments were found to have a Craft technology. As a result, no judgement could be made regarding experimental hypothesis 6.

Experimental hypothesis 7. Experimental hypothesis 7 stated that, in departments with a Routine technology, organizational effectiveness would be higher when there was low Formalization and high Expertise. Effectiveness was found to be highest when there was low Formalization and high Expertise. Effectiveness was found to be lowest when there was high Formalization and low Expertise. As a result of these findings, experimental hypothesis 7 was tentatively accepted.

Experimental hypothesis 8. Experimental hypothesis 8 stated that, in departments with an Engineering technology, organizational effectiveness would be higher when there was high Formalization and low Expertise. Effectiveness was found to be highest on two of the three variables when there was high Formalization and high Expertise. Effectiveness was found to be lowest in departments with high Formalization and low Expertise. As a result of these findings, experimental hypothesis 8 was rejected in the present study.

Experimental hypothesis 9. Experimental hypothesis 9 stated that, in departments with a Routine technology, organizational effectiveness would be higher when there was high Formalization and

low Expertise. Neither of the two departments were found to have what might be termed low Expertise. As a result, the two departments were divided on the basis of high and low Formalization only. Effectiveness was found to be higher on all three effectiveness variables in the department with low Formalization and high Expertise. Although two departments was considered an extremely small data base upon which to make such decisions, the data suggested that experimental hypothesis 9 should be rejected in this study.

As noted throughout Chapter 6, the actual differences in departmental mean scores on all of the research variables were small. As a result, the division of departments into high and low mean scores on these variables was somewhat arbitrary at best. Some trends did tend to emerge from the data however which suggested that some of the experimental hypotheses could be accepted but others should be rejected. The remainder require further investigation before a more defensible decision could be reached.

Summary of Research Findings in Relation to Individual Respondent Data

Chapter 7 presented the research findings when the research hypotheses were tested using a two-way analysis of variance technique on individual respondent data. Although it was acknowledged from the outset that the primary basis of testing organizational theory is entire organizations or units within organizations, there was some justification for testing the organizational hypotheses using individual respondent data. The data collected in this study were perceptual in nature. Respondents were asked to indicate their perceptions of

the work technology, organizational structure and organizational effectiveness of their respective departments. If it is true that people behave in relation to what they perceive, then it should be possible to detect patterns of perceived relationships between and among the research variables using individual respondent data. Insofar as the research findings in relation to individual respondent data were similar to those obtained in relation to departmental data, then the justification for testing organizational hypotheses in this way was supported to some extent.

Summary of significant interactions. A significant interaction between independent variables in this study suggested that the level of effectiveness was related to the way in which the two independent variables acted together. Only three interactions significant at the .05 level were obtained and each was obtained when Adaptability was the dependent variable. A significant interaction between Expertise and Search was obtained for all respondents. When this interaction was investigated, it was found to be ordinal in nature; that is, effectiveness was found to be higher when Expertise was high and the Search Behaviour Required was extensive. Conversely, effectiveness was found to be lower when Expertise was low and Search Behaviour Required was minimal.

A significant interaction between Formalization and Expertise was obtained for individuals who perceived their work to be Nonroutine technology. This interaction was found to be disordinal in nature; that is, effectiveness was found to be higher when there was low Formalization and high Expertise as opposed to when there was high

Formalization and low Expertise.

A significant interaction between Formalization and Expertise was obtained for individuals who perceived their work to be Engineering technology. This interaction was also found to be disordinal in nature; that is, effectiveness was found to be higher for low Formalization than high Formalization and higher for high Expertise than low Expertise.

No explanation for the finding that all three interactions were obtained when Adaptability was the dependent variable could be given.

Summary of significant main effects. As noted in Chapter 7, the fact that the independent variables appeared in more than one of the experimental hypotheses meant that some of the research hypotheses were redundant. Once a main effect on Expertise had been obtained in relation to experimental hypothesis 1, for example, it was only reasonable to expect that this main effect would be obtained again in hypotheses 4 and 5 because the same data were used.

Significant main effects on Expertise were obtained in relation to all three effectiveness variables. Effectiveness was found to be higher when there was high Expertise as opposed to low Expertise.

Significant main effects on Exceptions were obtained in relation to all three effectiveness variables as well. Effectiveness was found to be higher when there were many Exceptional Cases Encountered as opposed to when there were few Exceptional Cases Encountered.

Significant main effects on Formalization were obtained only

in the context of archetypal technologies. A significant main effect on Formalization was obtained when Adaptability and Overall Effectiveness were the dependent variables for individuals in departments having a Routine technology. Significant main effects on Formalization were obtained when Overall Effectiveness was the dependent variable for individuals who perceived their work to be Routine technology and for individuals who perceived their work to be Nonroutine technology. In all cases of a significant main effect on Formalization, effectiveness was found to be higher when there was low Formalization as opposed to high Formalization.

Relating the Findings to the Research and Experimental Hypotheses

A summary of the decisions made regarding the research and experimental hypotheses on the basis of the research findings was reported in Table 56 at the end of Chapter 7. On the basis of the research findings, it was possible to reject very few of the research hypotheses because the evidence was far from conclusive. Research hypotheses 1.3, 2.3 and 4.2 could be rejected because a significant main effect was obtained on Expertise in relation to all three of the effectiveness variables. Research hypotheses 2.3 and 4.3 could be rejected because a significant main effect was obtained on Exceptions in relation to all three of the effectiveness variables. Research hypothesis 9.2 could be rejected because a significant main effect on Formalization was obtained in relation to two of the three effectiveness variables. In all other cases, the research findings provided little or no support for the rejection of the related null

hypotheses.

The research findings permitted the tentative acceptance of experimental hypothesis 7, provided partial support for experimental hypothesis 4, did not appear to support experimental hypotheses 1, 2 and 3, permitted no judgement in the case of experimental hypotheses 3 and 6 and led to the tentative rejection of experimental hypotheses 8 and 9.

CONCLUSIONS

The conclusions are divided into two sections: (1) general conclusions regarding various aspects of the study, and (2) specific conclusions in relation to each of the experimental hypotheses generated for use in the study.

General Conclusions

A number of general conclusions regarding various aspects of the study are presented for consideration.

1. Utility of the Facet Design Technique.

The facet design technique proved to be a valuable tool in the development of this study. First, it assisted in identifying and clarifying the factors involved in the study and the possible relationships between them. Secondly, the facet design helped in the demarcation of the research parameters. Thirdly, the facet design assisted in the generation of a series of nine experimental hypotheses upon which the study was based. On the whole, the facet design technique was found to serve those ends for which Runkel and McGrath (1972:17)

maintained it was intended.

2. Limitations Posed by the Data

Several limitations posed by the data appeared to have an effect upon the study. First, the data collected were perceptual in nature which meant that the study was based on the assumption that respondents were able to give accurate indications of their perceptions and that these perceptions were reasonably valid in terms of the organizational characteristics being studied. In addition, there is always the possibility that perceptual data are subject to distortions arising from such things as what respondents think the researcher is trying to do and acting in relation to this, or the possibility that the perceptual data were gathered at a time when the organizational conditions were somewhat unusual or out of the ordinary. An example of the former distortion might be as follows: if respondents perceived that the researcher was trying to discover which departments were low in effectiveness, respondents might be tempted to protect themselves by inflating their estimations of perceived departmental effectiveness. An example of the latter kind of distortion might be the sudden dismissal of the college president during data collection. This event represented an unusual organizational condition. It is possible that respondents' perceptions were affected by this event. When this possibility was pursued with several respondents, the general indication was that, insofar as the focus of the questionnaire was on departments, they suspected that respondents' perceptions would probably not be affected all that much by the dismissal of the president. Nevertheless, perceptual data pose certain

limitations from the outset.

A second order of limitations posed by the data related to the fact that the numbers of respondents and departments involved in the study were small. This meant that when the experimental hypotheses were examined in relation to departments, twelve departments spread over four cells provided a rather tentative basis upon which to draw conclusions. Similarly, when respondent data were treated using two-way analysis of variance in order to determine whether or not the research hypotheses could be rejected on the basis of the findings, the numbers involved in some of the cells were also problematically small. As a result, the conclusions drawn on the basis of the research findings have to be seen as very tentative at best. Even when fairly consistent research findings were obtained, it would appear that such findings should be viewed with a great deal of caution especially when generalizing on the basis of them.

A third limitation posed by the data related to the fact that few differences were obtained on any of the variables. As a result it was necessary to employ some rather arbitrary cutting points in grouping data on the basis of high and low scores. This limitation is explored in more detail in the next section.

3. Further Refinement of the Instruments is Needed

A second general area of conclusions in the study deals with the need to refine further the instruments used. An examination of the frequency distribution of responses to items in each of the instruments as well as the findings which resulted from the factor analysis of the technology, structure and effectiveness instruments suggested

that these instruments might need refinement before they would be capable of measuring intraorganizational differences with any high degree of validity and reliability.

Many of the items in the technology, structure and effectiveness instruments appeared to have a relatively low capacity to discriminate among respondents. On a number of items, for example, upwards of seventy percent of all respondents, irrespective of job or departmental affiliation, indicated their perceptions by circling either the top two or bottom two response categories. While this may be an accurate reflection of the situation in departments of the college studied, such a finding does raise questions regarding the capacity of these instruments to discriminate among respondents and to detect intraorganizational differences within the type of organization examined in this study where they exist.

The factorial purity of these instruments is another aspect of the refinement needed. Although the effectiveness instrument appeared to be relatively factorially pure in relation to the factor analysis performed on the data, some questions arose with regards to both the technology and structure instruments.

Technology instrument. An examination of the frequency distribution of responses to items in the technology instrument tended to reveal that items relating to the Exceptions subscale had a lower capacity to discriminate among respondents than did items relating to the Search subscale. Responses on items relating to the Exceptions subscale tended to load heavily above the 3.00 midpoint on the response scale. As a result, a majority of the respondents in this

study perceived their work to involve many exceptional cases encountered, irrespective of their particular job or departmental affiliation. While this may have been an accurate reflection of this technology variable in the departments studied, there are still questions regarding the capacity of items in this instrument to discriminate among respondents and identify intraorganizational differences where they exist.

As far as the factorial purity of the technology instrument was concerned, more work appeared to be needed. In light of the correlation between the Exceptions and Search variables, it would appear that these two variables are significantly related and therefore not as independent as they probably should be if they were to measure the technology construct more accurately.

Structural inventory. The structural inventory posed some major problems in the context of this study. It should be noted that this was the first time that this instrument had been used either at the intraorganizational level or in a post-secondary institution. Previous applications of this instrument by MacKay (1964), Kolesar (1967), Anderson (1968) and Punch (1970) had been in the context of whole organizations such as public schools. Some of the problems encountered in the use of this instrument in this study may be attributable to the differences in the organizational context for which this instrument was developed as opposed to the organizational context in which it was used in this study.

An examination of the frequency distribution of responses on items revealed that many items appeared to have little capacity to

discriminate among respondents. While this may have been an accurate reflection of the situation in the departments studied, there is still the questions of whether or not the items in this instrument have the capacity to discriminate among respondents and to detect intraorganizational differences when they exist.

A more pressing problem in relation to this study was the apparent lack of factorial purity in the instrument. The instrument was composed of forty-six items relating to six bureaucratic subscales: Hierarchy of Authority, Rules for Members, Procedural Specificity, Impersonality, Specialization and Technical Competence. Kolesar (1967) maintained that, as a result of his findings, these six bureaucratic subscales could be collapsed into two factors: Concentration on Authority, which involved items relating to the first four bureaucratic subscales, and Emphasis on Expertise, which incorporated items relating to the last two bureaucratic subscales. A factor analysis performed by Kolesar indicated that four of the fifty items he used tended to demonstrate cross loadings and, on the basis of his suggestion, these items were dropped in the adoption of this instrument for use in this study.

When a factor analysis was performed on the data collected in this study, approximately half of the forty-six items demonstrated sufficient factor loadings on one or the other of the two factors to warrant consideration as a part of that factor. In addition, none of the six items supposedly relating to the Specialization subscale were found to load sufficiently on either factor to warrant inclusion. Faced with these findings, it was decided that the six bureaucratic

subscale correlations should be examined in order to see what their relationships might be. The results tended to support MacKay's (1964: 75) finding that the Technical Competence subscale correlated significantly and negatively with each of the first five subscales. As a result of this finding, there was a problem in rationalizing how items relating to the Specialization subscale could be merged into the creation of an Emphasis on Expertise factor as Kolesar had proposed.

Furthermore, four items supposedly related to the Concentration on Authority factor, and three supposedly related to the Emphasis on Expertise factor, were found to load sufficiently but negatively on the opposing factor. No explanation for this finding could be given.

As a result of these findings, only those items with sufficient factor loadings on the factor to which they were supposedly related were included in a second factor analysis. This time the factors appeared to be relatively pure. When the items which made up the Authority factor were examined in detail, it was decided that the factor label used by Kolesar was now inappropriate. Instead, this factor became Emphasis on Formalization.

An examination of the correlation between the two structural variables of Formalization and Expertise revealed that these two variables were highly independent as they correlated at .04 when a correlation of .20 was needed in this study to reach statistical significance.

Effectiveness instrument. The effectiveness instrument posed the fewest problems as far as factorial purity was concerned. The factor analysis of data relating to this instrument demonstrated that

all items loaded highly on the factors for which they were designed.

Once more, however, there appeared to be problems with the capacity of items to discriminate among respondents. An examination of the frequency distribution of responses to all items tended to show that most respondents perceived the effectiveness of their respective departments in relation to one of the top two response categories. While such a finding was not surprising given the nature of the concept involved and the perceptual distortions which may have been operating, it does raise questions regarding whether or not this instrument is capable of discriminating among respondents or detecting intraorganizational differences when they do exist.

According to the correlation matrix, the three effectiveness variables of Productivity, Adaptability and Overall Effectiveness were highly correlated with one another. This finding compared favourably to what Mott (1972) had discovered in his development and application of this instrument.

4. Relationship between Demographic and Research Variables on the Basis of the Correlation Matrix

An examination of the correlation matrix relating to eleven demographic and seven research variables revealed that the seven research variables were relatively independent of the demographic variables. Because sex was a dichotomous rather than continuous variable, a t-Test was used to examine its relationship with the research variables. Sex too was found to be relatively independent of the research variables. As a result of these findings, the demographic variables were ignored in testing the hypothesized

relationships between and among the seven research variables.

5. Few Intraorganizational Differences

There appeared to be few intraorganizational differences between departmental mean scores on the research variables. This study was based on the notion that there would be important intra-organizational differences in the technology, structure and effectiveness variables but few were found. It was not possible to determine whether this finding was obtained because the research instruments lacked the capacity to discriminate among respondents and detect intraorganizational differences on the seven research variables or because there were just not that many intraorganizational differences in the college studied.

6. Qualified Support for the Experimental Hypotheses

When the experimental hypotheses were tested on the basis of departments, only qualified support in specific cases was found. Experimental hypotheses 5 and 7 appeared to be supported. Experimental hypotheses 1, 2 and 4 appeared to have partial support. Experimental hypothesis 6 could not be tested as there were no departments with a Craft technology. Experimental hypotheses 3, 8 and 9 appeared to be rejected.

Similar findings were obtained when research hypotheses derived from the nine experimental hypotheses were tested using a two-way analysis of variance technique on data relating to individual respondents. Experimental hypothesis 7 appeared to have tentative support. There was marginal support for experimental hypotheses 1, 2,

4 and 5 but not sufficient to warrant the judgement that they were supported as stated. There were no findings in relation to experimental hypotheses 3 and 6 so no judgement could be made. Experimental hypotheses 8 and 9 appeared to be rejected.

In the next section, each of the nine experimental hypotheses is examined in the light of research findings in relation to both departments and individual respondents.

Specific Conclusions Regarding the Nine Experimental Hypotheses

The primary test of the experimental hypotheses was the relationship between structural and technology variables on the basis of mean effectiveness scores in departments. The secondary test of these hypotheses was the use of two-way analysis of variance tests on data relating to individual respondents. The small numbers involved plus the apparent absence of many differences between mean scores on the research variables meant that any decisions reached with regard to the acceptance or rejection of the experimental hypotheses are tentative at best.

Experimental Hypothesis 1

Experimental hypothesis 1 stated that organizational effectiveness would be higher when the emphasis on the two structural variables, Formalization and Expertise, varied inversely.

Findings in departments. Organizational effectiveness was higher when there was low Formalization regardless of the emphasis on Expertise.

Findings on individuals. Organizational effectiveness was higher when there was high Expertise, regardless of the emphasis on Formalization.

Conclusions. Experimental hypothesis 1 cannot be accepted on the basis of findings in this study.

Experimental Hypothesis 2

Experimental hypothesis 2 stated that organizational effectiveness would be higher when the emphasis on Formalization, a structural variable, and the number of Exceptions, a technology variable, varied inversely.

Findings in departments. Organizational effectiveness was higher when there were many Exceptions regardless of the emphasis on Formalization.

Findings in individuals. Organizational effectiveness was higher when there were many Exceptions regardless of the emphasis on Formalization.

Conclusions. Experimental hypothesis 1 cannot be accepted on the basis of findings in this study.

Experimental Hypothesis 3

Experimental hypothesis 3 stated that organizational effectiveness would be higher when the emphasis on Formalization, a structural variable, and the extent of Search, a technology variable, varied inversely.

Findings in departments. Organizational effectiveness was

higher when there was low Formalization.

Findings on individuals. There were no research findings on the basis of individual data as no significant interaction or main effects were obtained on the basis of any of the effectiveness variables.

Conclusions. Experimental hypothesis 3 can be tentatively rejected on the basis of findings in this study.

Experimental Hypothesis 4

Experimental hypothesis 4 stated that organizational effectiveness would be higher when the emphasis on Expertise, a structural variable, and the number of Exceptions, a technology variable, varied directly.

Findings in departments. Organizational effectiveness was higher when there were many Exceptions regardless of the emphasis on Expertise.

Findings on individuals. Organizational effectiveness was higher when there was high Expertise and many Exceptions but not when both were low as hypothesized.

Conclusions. Experimental hypothesis 4 cannot be accepted on the basis of the findings in this study.

Experimental Hypothesis 5

Experimental hypothesis 5 stated that organizational effectiveness would be higher when the emphasis on Expertise, a structural variable, and the extent of Search, a technology variable, varied

directly.

Findings in departments. Organizational effectiveness was higher when either Expertise was high and Search was extensive or when Expertise was low and Search was minimal.

Findings on individuals. Organizational effectiveness was higher when there was high Expertise.

Conclusions. Experimental hypothesis 5 can be tentatively accepted on the basis of findings in this study.

Experimental Hypothesis 6

Experimental hypothesis 6 stated that, in a Craft technology, organizational effectiveness would be higher when there was low Formalization and high Expertise. No judgement could be made on experimental hypothesis 6 because there were insufficient data to test this hypothesis.

Experimental Hypothesis 7

Experimental hypothesis 7 stated that, in a Nonroutine technology, organizational effectiveness would be higher when there was low Formalization and high Expertise.

Findings in departments. Organizational effectiveness was higher when there was low Formalization and high Expertise.

Findings on individuals. Organizational effectiveness was higher when there was low Formalization.

Conclusions. Experimental hypothesis 7 can be tentatively accepted on the basis of findings in this study.

Experimental Hypothesis 8

Experimental hypothesis 8 stated that, in an Engineering technology, organizational effectiveness would be higher when there was high Formalization and low Expertise.

Findings in departments. Organizational effectiveness was higher when there was high Formalization and high Expertise.

Findings on individuals. Organizational effectiveness was higher when both Formalization and Expertise were high or when both were low.

Conclusions. Experimental hypothesis 8 was rejected on the basis of findings in this study.

Experimental Hypothesis 9

Experimental hypothesis 9 stated that, in a Routine technology, organizational effectiveness would be higher when there was high Formalization and low Expertise.

Findings in departments. Organizational effectiveness was higher when there was low Formalization and high Expertise.

Findings on individuals. Organizational effectiveness was higher when there was low Formalization and high Expertise.

Conclusions. Experimental hypothesis 9 can be rejected on the basis of findings in this study.

IMPLICATIONS OF THE FINDINGS AND THE CONCLUSIONS

On the basis of the research findings and the conclusions drawn, it is possible to identify a number of possible implications for consideration.

The purpose of the study was to explore the intraorganizational relationship between organizational effectiveness and the selected organizational characteristics of technology and structure in an attempt to clarify what relationships these characteristics might have to organizational effectiveness. Some clarification did occur, at least within the limited context of what has to be viewed as a case study of one institution, but some confusions arose as well. Further research is obviously necessary to confirm what appeared to be findings in this study.

The first implication of the findings is the possibility that there may not be significant or even important intraorganizational differences in a community college. The relative lack of difference between departmental mean scores on the research variables has already been noted a number of times. On the other hand, sharper instruments might be able to detect greater differences and, on the basis of such a finding, perhaps some of the hypothesized relationships in this study could be tested more accurately. The chances are, however, that the nature of post-secondary institutions is such that there may not be the kind of intraorganizational differences which one might expect to find in a large business or industrial organization. The majority of staff in a post-secondary institution are highly educated people

involved in the instructional process. Most administrators in post-secondary institutions, even in the non-instructional departments, are well educated and have often been involved in educational organizations for a number of years. Support staff such as secretaries work in constant association with educational matters. The general atmosphere of most post-secondary institutions is one which stresses personal competence and meeting one's responsibilities in the job, whatever the job. On these bases, perhaps one should not expect to find many intraorganizational differences in such things as structure and technology.

A second implication of the research findings relates to the emergence of the structural variable, Emphasis on Expertise, as a variable frequently found to be a factor associated with the level of organizational effectiveness perceived. In almost every case, organizational effectiveness was found to be higher when there was high Expertise. The reasons for this finding may have been addressed already in the previous paragraph. After all, post-secondary institutions have a large number of well educated people on staff who have been hired because of their training, expertise and skill. It is not surprising that high effectiveness should be found associated with high Expertise.

A third implication of the research findings related to the emergence of the technology variable, Number of Exceptions, as a factor found to be associated with the level of organizational effectiveness perceived. In almost every case, organizational effectiveness was found to be higher when there were many Exceptions.

One possible explanation of this finding was presented in an earlier chapter. The Exceptions variable might be a reflection of the amount of variety and challenge in the work. It has been the experience of business and industry over the past several decades that people need a reasonable amount of variety and challenge in their work in order to feel some satisfaction and motivation. People such as Price (1968) and Steers (1975) indicated that the level of motivation and morale are factors in the level of organizational effectiveness achieved. This may be particularly true in a post-secondary institution where a majority of staff are well educated and therefore expect a fairly high degree of variety and challenge in their work.

A fourth implication of the research findings relates to the discovery that effectiveness was often higher when there was low Formalization. In light of the previous two implications, this finding comes as no surprise. Low Formalization appears to be logically compatible with high Expertise. This was borne out by the research findings in relation to both Nonroutine and Routine technologies.

A fifth implication of the research findings is that the theory upon which the experimental hypotheses were based may be valid in the context of organizations in general but not in the context of post-secondary institutions or at the intraorganizational level. Educators have long maintained that educational institutions are different from business or industrial concerns. Blau and Scott (1962) classified educational institutions as "service organizations" because they viewed such organizations as different from mutual

benefit, business concerns and commonweal organizations. While it would be dangerous to build theory on the findings of this study, there is some reason to believe that organizational theory may not apply to educational organizations in the same way it appears to apply to business concerns, for example.

A final implication of this study might be that too much has been assumed and that the approach to exploring the relationships between technology, structure and effectiveness was too simplistic. This study set out to examine what must be viewed as fairly complex phenomena. It was based on perceptual data where more concrete or sophisticated measures of technology, structure and effectiveness might have been used. It was based on an assumption that Perrow's notion of technology was valid and that distinctions could be made on the basis of what turned out to be fairly uniform data on the two variables. It was based on the assumption that a bureaucratic structural inventory reduced to two factors was an appropriate means of measuring the intraorganizational structure of a post-secondary institution. It was based on the assumption that perceptual measures of effectiveness on three factors—Productivity, Adaptability and Overall Effectiveness—were a valid means of measuring the organizational effectiveness of departments in a post-secondary institution. The fact of the matter is that the present study was meant to be an exploration of the interrelationships between three concepts—technology, structure and effectiveness—which were not without confusion in their own rights, let alone in concert. If nothing else, this study has helped identify a number of suggestions for further

research.

SUGGESTIONS FOR FURTHER RESEARCH

This study has given rise to a long list of suggestions for further research but only some of the main ones will be presented for consideration in this section.

1. Intraorganizational Structure

This study found few intraorganizational differences in structure even though Hall (1969) maintained that there were intra-organizational differences in structure on the basis of research he had conducted. Further research would be required in order to determine if there are few intraorganizational differences in structure in post-secondary institutions or the instrument used in this study was not sufficiently sensitive to detect the differences.

The appropriateness of a bureaucratic structural inventory in an intraorganizational context is another matter worth investigation. While it would appear suitable, there is a possibility that other structural measures might be more appropriate or productive. A number of alternatives were referred to in the review of related literature and one of these might prove a better means of investigating intraorganizational structure.

The problems encountered in the factor analysis of data collected with the bureaucratic structural inventory raised a number of issues for further research. First of all, is this instrument really measuring a two factor construct? Would a return to the six subscales as a means of describing structure be indicated? Why did

a number of items load significantly, but negatively, on the factor opposite from the one to which they were conceptually related?

2. Technology

The concept of technology requires further research. Perrow's technology construct is attractive because it is relatively simple and suitable for use in comparing technology in different kinds of organizations. Perhaps it is too simple. Perhaps the more detailed approach to technology assessment which the Aston people developed is more valid and meaningful. On the other hand, if a simple construct such as this can provide valid and meaningful information, then that may be enough. Although the differences in departmental mean scores on technology variables were not that great, the location of departments on the technology grid made sense. Departments involved in instruction or counselling were expected to have a Nonroutine technology and they did. On the other hand, Maintenance and the Steno Pool were expected to have Routine technologies and they did. Perrow's technology construct appeared to work in this study.

The patterns of organizational structure which would be compatible with different technologies is another area for further research. Although the evidence found in this study was far from conclusive, it would appear that the hypothesized relationship between structural variables for a Nonroutine technology were supported. There would be value in discovering structural patterns which were compatible with different technologies. Such findings might serve to refine organizational theory as well as serve as a guide in the structuring of new organizations or the reorganization

of existing ones. Clearly, however, further research is required.

3. Organizational Effectiveness

It almost goes without saying that organizational effectiveness is an area which requires further research. While it is probable that organizational effectiveness is one of those concepts which will defy thorough understanding for some time to come, further research in this area will increase our knowledge of the factors which are involved and the relationship between them and other aspects of organization.

The Mott instrument used in this study is a rather simple approach to measuring effectiveness. One suggestion for further research would be to compare the findings of this instrument with other measures of effectiveness. The inherent danger in using an instrument such as this is the possibility of oversimplification. On the other hand, if valid and meaningful information can be gathered in a relatively simple way, there is no problem as long as the information is viewed in relation to how it was obtained. Organizational effectiveness obviously relates to something more complex than perceptual data on productivity, adaptability and overall effectiveness. For the purposes of this study, this was taken as one kind of indicator of organizational effectiveness. Perhaps through further research, other valid but readily available indicators of organizational effectiveness could be identified.

4. Some Alternative Hypotheses for Research

This study was based on a series of experimental hypotheses

which were not found to be supported in many cases by the data. In light of the research findings, the following alternative hypotheses appeared to be supported but require verification through research.

1. Organizational effectiveness will be higher in departments of a post-secondary institution when there is high Expertise.
2. Organizational effectiveness will be higher in departments of a post-secondary institution when there is low Formalization.
3. Organizational effectiveness will be higher in departments of a post-secondary institution when the Number of Exceptional Cases Encountered is high.
4. In departments of a post-secondary institution with an Engineering technology, organizational effectiveness will be higher when there is medium Formalization and medium Expertise.
5. In departments in a post-secondary institution with a Routine technology, organizational effectiveness will be higher when there is low Formalization and high Expertise.

A Post-script

This study set out to explore the relationship between organizational effectiveness and the selected organizational characteristics of technology and structure at the intraorganizational level of a post-secondary institution in an attempt to clarify what relationships technology and structure might have to organizational effectiveness.

More research into the intraorganizational relationship

between these variables would appear to be warranted as we move toward developing and refining organizational theory. What may emerge is a kind of modular or pluralistic theory of organizations which addresses both the differences within as well as the integration of these differences into viable, effective, whole organizations. For the time being, as Magnusen (1973:28) noted:

We feel we are confused as ever. But we think we are confused on a higher level and about more important things.

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APPENDICES

APPENDIX A

PILOT STUDY TECHNOLOGY INSTRUMENT

Office #130-D, Educ. II,
Dept. of Educational
Administration,
Faculty of Education,
University of Alberta,
Edmonton, Alberta

Dear Respondent,

I am conducting a pilot study of the attached questionnaire preparatory to doing research in an Alberta Community College later this fall. I would sincerely appreciate your cooperation and assistance in completing the attached questionnaire.

The questionnaire attempts to identify the nature of the work you do in your job. Respond to each item as honestly and objectively as possible. Please do not attempt to make your work appear any simpler or more complex than you really perceive it to be.

On the basis of the data collected in this pilot study, I hope to be able to refine this instrument for use in my research work.

Completed questionnaires may be returned directly to my office or to

Thank you in advance for your assistance in this regard.

Yours sincerely,

Mat Hassen
Graduate student

PERSONAL DATA

Complete each of the following items. All information will be treated confidentially.

1. I am: Male; Female
2. My age on my last birthday was
3. The highest level of education achieved (as of December 31, 1975) was:
 - ... Grades 1-12
 - ... College, Technical or Proprietary School: No. of years
 - ... University: Degree(s) held
 - ... Other (specify)
4. Department in which you work:
5. Job title:

In completing the following questions regarding work experience, respond in terms the nearest number of whole years worked.

6. Number of years in your present job:
 - ... 1 year ... 3 years ... 5 years ... 7 years ... 9 years
 - ... 2 years ... 4 years ... 6 years ... 8 years or more
7. Number of years working in this organization:
 - ... 1 year ... 3 years ... 5 years ... 7 years ... 9 years
 - ... 2 years ... 4 years ... 6 years ... 8 years or more
8. Number of years doing work similar to your present job:
 - ... 1 year ... 3 years ... 5 years ... 11-20 yrs. ... 31 yrs.
 - ... 2 years ... 4 years ... 6-10 yrs. ... 21-30 yrs. or more
9. Number of years of total work experience:
 - ... 1 year ... 3 years ... 5 years ... 11-20 yrs. ... 31 yrs.
 - ... 2 years ... 4 years ... 6-10 yrs. ... 21-30 yrs. or more

** TO BE COMPLETED, IF YOU WISH, AFTER YOU HAVE RESPONDED TO THE QUESTIONNAIRE

Suggestions for changes or improvements in the questionnaire

NATURE OF THE WORK DONE

The following items relate to the nature of the work you do in your department. Before responding, take a moment to think about your job and all of the things which are involved in it.

Definition of Terms

1. Exceptional cases - tasks or problems which are nonroutine or somewhat out-of-the-ordinary.
2. Procedures or solutions - ways in which one handles the exceptional cases which arise in one's job.

Read each of the following statements. Circle the letter corresponding to the ONE which best fits your present job a majority of the time.

- A Few exceptional cases occur; there are established procedures or solutions for handling most of them when they occur.
- B Few exceptional cases occur; one must search for appropriate procedures or solutions in order to handle such cases when they do occur.
- C Many exceptional cases occur; one must search for appropriate procedures or solutions in order to handle most of these cases when they occur.
- D Many exceptional cases occur; there are established procedures or solutions for handling most of them when they occur.

Respond to each of the following items by circling the number under the most appropriate response: SD - Strongly Disagree; D - Disagree; U - Undecided; A - Agree; SA - Strongly Agree

	SD	D	U	A	SA
1. The tasks involved in my job are always the same from one day to the next.	5	4	3	2	1
2. Most of the problems which arise in my job can be resolved that same day.	5	4	3	2	1
3. My job involves a large number of different kinds of tasks.	1	2	3	4	5
4. There are few readily-available solutions to the kinds of problems which arise in my job.	1	2	3	4	5
5. There is a great deal of variety in my job.	1	2	3	4	5

	SD	D	U	A	SA
6. Someone else is responsible for resolving most of the problems which I encounter in my job.	5	4	3	2	1
7. The work demands involved in my job cover a broad range of things.	1	2	3	4	5
8. There are routine procedures for handling most of the tasks involved in my job.	5	4	3	2	1
9. The work I do is similar from one hour to the next.	5	4	3	2	1
10. Many of the problems which arise in my job involve complex issues.	1	2	3	4	5
11. It is difficult to predict, in advance, what I will have to do in my job from one day to the next.	1	2	3	4	5
12. Most of the problems which arise in my job are easily resolved by people with jobs similar to mine.	5	4	3	2	1
13. My job requires me to cope with a series of problems, one after another.	1	2	3	4	5
14. Most of the problems I encounter in my job can be resolved within an hour or two.	5	4	3	2	1
15. My job involves doing similar things at the same time every day.	5	4	3	2	1
16. Most of the problems which I encounter in my job are too complex for one individual to resolve on his or her own.	1	2	3	4	5
17. The tasks involved in my job are quite different from one another.	1	2	3	4	5
18. My job requires very little thinking to handle the tasks involved.	5	4	3	2	1
19. I encounter many cases which have to be treated individually or uniquely in my job.	1	2	3	4	5
20. A person would require a broad range of skills in order to handle the tasks involved in my job.	1	2	3	4	5
21. My job is essentially routine in nature.	5	4	3	2	1

22. I encounter problems in my job for which there are no readily-available solutions

Rarely or
never

1

Once a
month

2

Once a
week

3

Every
few days

4

Every
day

5

APPENDIX B

FACTOR ANALYSIS OF THE TECHNOLOGY INSTRUMENT USED IN THE PILOT STUDY

Results of a Factor Analysis of the Technology Instrument
Used in the Pilot Study: Varimax Rotated

<u>Variable</u>	<u>Communality</u>	<u>Factor 1</u>	<u>Factor 2</u>
1	.399	.600	.196
2	.527	.553	.470
3	.485	.645	.262
4	.443	.337	.574
5	.540	.735	-.004
6	.324	-.265	.504
7	.474	.565	.393
8	.707	.228	.810
9	.705	.838	.042
10	.524	.361	.628
11	.307	.404	.379
12	.498	.125	.695
13	.497	.609	.356
14	.389	.590	.203
15	.295	.242	.487
16	.467	.361	.580
17	.500	.692	.146
18	.528	.138	.713
19	.546	.576	.463
20	.630	.439	.661
21	.653	.641	.492
22	.582	.578	.497
	11.020	5.865	5.155

APPENDIX C

LETTER AND QUESTIONNAIRE USED IN STUDY

7-130D, Education II,
Department of Education
Administration,
Faculty of Education,
The University of Alberta,
Edmonton, Alberta.

November 17, 1975

Dear Respondent,

As a doctoral student in Educational Administration at the University of Alberta, I am conducting a research study in an attempt to identify the relationship between the nature of the work people do in departments of post-secondary institutions and the ways in which that work, and the people engaged in it, are organized. Dr. C. D. Stewart has kindly given his permission and approval to conduct my study here in Lethbridge Community College. I would sincerely appreciate it if you would take the time to be a part of my study.

I will be here in the College from Monday, November 17th to Friday, November 21st. During this time, I plan to interview a number of people who are engaged in different jobs as a double-check upon the kinds of questions posed in the attached questionnaire. In addition, I will be available to answer any questions or concerns you may have regarding any aspect of my study.

I appreciate how busy you must be but I hope that you will find the time to complete and return the attached questionnaire to me by Friday, November 21st. While questionnaires may be returned by mail (courier service) in the envelope provided, I would like to be able to take as many completed questionnaires as possible back with me at the end of this week.

Let me assure you that all information collected will be handled confidentially and reported in terms of groups of responses only.

Thank you in advance for your cooperation and assistance in this matter. Please feel free to contact me personally at any time if there is any way in which I might be of service.

Respectfully yours,

Mat R. Hassen,
Graduate Student

PART IPERSONAL DATA

Complete each of the following by checking the most appropriate response. All information will be treated confidentially.

1. Sex: Male; Female.....:
2. Age category, as of my last birthday:

.... 20 yrs. or less	.... 31-35 yrs.	.... 41-45 yrs.	.... 51-55 yrs.
.... 21-25 yrs.	.... 36-40 yrs.	.... 46-50 yrs.	.... 56 yrs. or older
.... 26-30 yrs.			
3. The highest level of education achieved (as of December 31, 1975) was:

.... Grades 1 - 12
.... College, Technical School or equivalent
.... University: Degree(s) held: Bachelor.....; Master.....; Doctorate.....:
.... Other (please specify)
4. In which of the following DIVISIONS do you presently work?

.... President's Office	.... Administrative Services	.... Continuing Ed.
.... Instructional	.... Student Services	or Community
Services (Programs)		Services
5. In which DEPARTMENT do you presently work?
6. Which of the following job titles best describes your present job?

.... President, Vice-President, Dean, or Division Director	.... Maintenance staff
.... Chairman, Director or Coordinator of a Department	.... Typist, Clerk, Receptionist or equivalent
.... Instructor	.... Executive Secretary or equivalent
.... Counsellor	IF NONE OF THE PRECEDING ARE SUITABLE, PLEASE SPECIFY:
.... Librarian	Job title
.... Admin. Assistant, Assistant Manager, Supervisor	Nature of work done
.... Teacher Aide, Technician or equivalent	.....

The following items relate to your work experience. Respond in terms of the nearest number of full years worked.

7. Number of years in present job:.....
8. Number of years in this organization:.....
9. Number of years doing similar work:.....
10. Number of years of work experience since leaving high school:.....

PART IINATURE OF THE WORK DONE

The following items relate to the nature of the work you do in your department. Circle the response to each item which is most appropriate to your job a majority of the time. (SA - Strongly Agree; A - Agree; U - Undecided; D - Disagree; SD - Strongly Disagree)

- | | | | | | | |
|------|--|----|---|---|---|----|
| 1. | My job involves a large number of tasks. | SA | A | U | D | SD |
| 2. | Most of the problems which arise in my job are easily resolved. | SA | A | U | D | SD |
| 3. | There is a great deal of variety in my job. | SA | A | U | D | SD |
| 4. | There are few readily-available solutions to the kinds of problems which arise in my job. | SA | A | U | D | SD |
| 5. | The work I do is similar from one hour to the next. | SA | A | U | D | SD |
| 6. | Most of the problems which arise in my job involve complex issues. | SA | A | U | D | SD |
| 7. | The tasks involved in my job are quite different from one another. | SA | A | U | D | SD |
| 8. | There are routine procedures for handling most of the tasks involved in my job. | SA | A | U | D | SD |
| 9. | My job requires me to cope with a series of problems, one after another. | SA | A | U | D | SD |
| 10. | Someone else is responsible for resolving many of the problems which I encounter in my job. | SA | A | U | D | SD |
| 11. | The tasks involved in my job are always the same from one day to the next. | SA | A | U | D | SD |
| 12. | My job requires little extensive thinking in order to handle the tasks involved. | SA | A | U | D | SD |
| 13. | Most of the problems I encounter in my job can be handled within an hour or two of when they arise. | SA | A | U | D | SD |
| 14.. | Most of the problems I encounter in my job involve issues which are too complex for one individual to resolve on his or her own. | SA | A | U | D | SD |

PART IIIDEPARTMENTAL INVENTORY

The following items relate to the way in which people and work are organized in your department. Respond to each item by circling the most appropriate response for a majority of the time in your department. (DT- Definitely True; PT- Partially True; U- Undecided; PF- Partially False; DF- Definitely False)

- | | | |
|-----|---|---------------|
| 1. | For the most part, people who want to make their work decisions are discouraged from doing so in this department. | DT PT U PF DF |
| 2. | There are overlaps in people's jobs and responsibilities in this department. | DT PT U PF DF |
| 3. | Promotion in this department is based entirely upon how well a person does his or her job. | DT PT U PF DF |
| 4. | Rules regarding when people arrive and depart for the day are strictly enforced in this department. | DT PT U PF DF |
| 5. | People in this department get their orders from 'higher up' in the college. | DT PT U PF DF |
| 6. | The use of a wide variety of methods to get work done is encouraged in this department. | DT PT U PF DF |
| 7. | People must possess above-average qualifications before they are hired to work in this department. | DT PT U PF DF |
| 8. | People in this department are allowed to do as they please in their job. | DT PT U PF DF |
| 9. | We are expected to be courteous but reserved at all times with students or members of the public with whom we may come in contact in our job. | DT PT U PF DF |
| 10. | There are overlaps in people's jobs and responsibilities in the college as a whole. | DT PT U PF DF |
| 11. | Promotions or extra salary increments are based on objective evaluations of a person's work and capabilities. | DT PT U PF DF |
| 12. | People in this department are expected to follow strict operating procedures in doing their assigned work. | DT PT U PF DF |
| 13. | There can be little action in this department until a supervisor approves a decision. | DT PT U PF DF |
| 14. | Times for coffee breaks and lunch hours are strictly enforced in this department. | DT PT U PF DF |
| 15. | People must have above-average abilities before they are hired to work in this department. | DT PT U PF DF |

16. Each person in this department is responsible to a supervisor to whom he or she regularly reports DT PT U PF DF
17. Going through 'proper channels' with complaints or requests is constantly stressed in this department. DT PT U PF DF
18. Administrators and supervisors in this department avoid social contact with people who work here. DT PT U PF DF
19. People in this department are required to do jobs for which they have no particular training or preparation. DT PT U PF DF
20. Promotions and extra salary increments are based on the personal preferences of those who make such decisions in this department. DT PT U PF DF
21. A person in this department is expected to abide by the spirit of the rules rather than by the letter of the rules. DT PT U PF DF
22. A person in this department can make decisions without having to first check with anyone else. DT PT U PF DF
23. There is only one way to do a job in this department and that's the supervisor's way. DT PT U PF DF
24. Past work experience plays a major part in who is hired to work in this department. DT PT U PF DF
25. Nothing is said if a person in this department arrives a little late or departs a little early from time to time. DT PT U PF DF
26. I have to ask my supervisor before I can go ahead and do most of the things in my job. DT PT U PF DF
27. People in this department socialize with fellow workers outside of the job. DT PT U PF DF
28. Support staff (typists, aides, maintenance staff, etc.) provide assistance whenever required or requested. DT PT U PF DF
29. The same procedures are to be followed in almost all situations in handling the work in this department. DT PT U PF DF
30. There isn't much of a chance for promotion or extra increments in this department unless one is 'in' with those who make such decisions. DT PT U PF DF
31. People in this department are constantly being checked up for rule violations. DT PT U PF DF

32. No one can get the necessary supplies or materials without first getting the supervisor's permission or approval. DT PT U PF DF
33. There is a written manual of rules, regulations and procedures for people to follow. DT PT U PF DF
34. Many people are hired to work in this department because they have attractive personalities, or other personal features, rather than for their qualifications or abilities to do the job. DT PT U PF DF
35. Whenever we encounter a problem in our work, we are supposed to go to the same person for the answer. DT PT U PF DF
36. Administrators or supervisors prefer to be called by their proper names (and titles, if they have one) rather than be on a first-name basis. DT PT U PF DF
37. People have to do a lot of unnecessary work which could, or should, be done by someone else. DT PT U PF DF
38. Even small matters have to be referred to a supervisor for a final answer. DT PT U PF DF
39. Written instructions or orders from 'higher ups' are carried out unquestioningly. DT PT U PF DF
40. In order to get a promotion or a salary increase in this department, one has to be an 'insider' or 'know' somebody important in the college. DT PT U PF DF
41. 'Red Tape' is a problem in getting anything done around here. DT PT U PF DF
42. Many of the decisions I make have to have my supervisor's approval. DT PT U PF DF
43. During regular working hours, people are expected not to leave their department without permission of their supervisor. DT PT U PF DF
44. Promotion is based upon how well you are liked. DT PT U PF DF
45. People only do what they were hired to do and nothing more, especially if it involves something someone else was hired to do. DT PT U PF DF
46. No matter what personal problems a person in this department may have from time to time, everyone is treated in the same way at all times. DT PT U PF DF

PART IV

EFFECTIVENESS

Every worker produces something in his or her work. It may be a "product" or a "service". Because it is sometimes difficult to identify the various products or services, the following list of examples is provided.

Types material	Instruction	Building maintenance
Reports, studies, surveys	Counselling	Community relations
Filing	Testing, evaluation	Management meetings
Food preparation	Policy development	Planning
Program development	Budgeting	Performance appraisal

Think about the things which you produce in your work and the things which are produced by other people in your department.

1. In thinking about the things which are produced by people in your department, how much would you say they are producing?

Production is very low	Production is fairly low	Production is neither high nor low	Production is fairly high	Production is very high
1	2	3	4	5

2. Of the things produced by people in your department, how would you assess the quality of the products or services produced?

Quality is low or poor	Quality is not too good	Quality is fair	Quality is good	Quality is excellent
1	2	3	4	5

3. Do people in your department seem to get maximum output from the resources (money, people, time, equipment, etc.) they have available? That is, how efficiently do they do their work?

Do not work efficiently	Not very efficiently	Fairly efficiently	They are quite efficient	They are extremely efficient
1	2	3	4	5

4. How good a job do people in your department do in anticipating problems that may come up in the future and either preventing them from occurring, or minimizing their effects when they do occur?

Anticipation of problems is poor	Anticipation is not very good	Fair job of anticipation	Very good job of anticipation	Excellent anticipation
1	2	3	4	5

5. From time to time, new ways are found to do the work in your department. How good a job do people in your department do in keeping up with those changes which could have a direct effect on the ways in which they do their jobs?

Do a poor job of keeping up	Not too good a job	A fair job	Do a good job	Do an excellent job of keeping up
1	2	3	4	5

6. When changes are made to the routines, procedures or equipment involved in the work of your department, how quickly do people in your department accept and adjust to these changes?

Accept/adjust very slowly	Rather slowly	Fairly rapidly	Accept/adjust quite rapidly	Accept/adjust immediately
1	2	3	4	5

7. What proportion of the people in your department readily accept and adjust to changes when they are made?

Considerably less than half	Slightly less than half	Slightly more than half	Considerably more than half	Practically everyone
1	2	3	4	5

8. From time to time, job-related problems arise which require some kind of problem-solving activity. How adequate is the problem-solving process in your department?

Totally inadequate	Not very adequate	Fairly adequate	Quite adequate	Excellent
1	2	3	4	5

9. From time to time, emergencies arise such as crash programs, work running far behind schedules and deadlines, major equipment problems and so on. When these emergency situations occur, they usually mean work overloads for many people. Some work groups cope with such situations more readily and successfully than others. How would you rate the people in your department when it comes to coping with these kinds of situations?

They do a poor job	They do not do very well	They do a fair job	They do a good job	They do an excellent job
1	2	3	4	5

10. In general, how would you rate the overall effectiveness of your department?

Very low	Quite low	Average	Quite High	Very High
1	2	3	4	5

APPENDIX D
FOLLOW-UP LETTER

20 November, 1975

Faculty and Staff
Lethbridge Community College

Dear Respondent:

I would like to thank you for having taken the time to complete and return my research questionnaire. I fully appreciate that extra demands such as this are a nuisance at times, but cooperation from people such as yourself is critical for graduate students who are attempting to meet the research requirements of their programs.

If you have not, as yet, had a chance to complete the questionnaire, please try to do so. As much as is humanly possible, respond to the items as you might have done last week, for example, before the events of this week occurred. My study is dependent upon a high rate of return from every school and department in the college.

I'll be in the College (Board Room) until approximately 3:00 p.m. Friday, November 21st. Arrangements have been made, however, to send any remaining questionnaires to me via the government's courier service.

A copy of the dissertation will be forwarded to the college upon completion.

Thank you once again for your cooperation and assistance.

Respectfully yours,

Mat R. Hassen
Graduate Student

/kgf

APPENDIX E

FACTOR ANALYSIS OF TECHNOLOGY INSTRUMENT

Results of a Factor Analysis of the Technology
Instrument Used in the Study: Varimax Rotated

<u>Variable</u>	<u>Communality</u>	<u>Factor 1</u>	<u>Factor 2</u>
1	.429	.204	.623
2	.568	-.060	.751
3	.564	.418	.624
4	.616	-.014	.785
5	.509	.628	.339
6	.564	.112	.743
7	.453	.648	.180
8	.683	.826	.034
9	.266	.516	.003
10	.596	.744	.206
11	.517	.676	.244
12	.138	.100	.358
13	.648	.415	.613
14	.521	.721	.020
	6.973	3.710	3.263
Percentage of Common Variance	100.000	53.199	46.801
Percentage of Total Variance	49.808	26.498	23.311

APPENDIX F

FACTOR ANALYSIS OF STRUCTURAL INVENTORY

Results of a Factor Analysis of the Structural
Instrument Used in the Study: Varimax Rotated

<u>Variable</u>	<u>Communality</u>	<u>Factor 1</u>	<u>Factor 2</u>
1	.299	.089	-.470
2	.172	-.229	-.346
3	.221	.443	.159
4	.387	.436	-.444
5	.103	.289	.140
6	.344	.332	-.483
7	.407	.314	-.555
8	.193	.215	-.382
9	.204	.116	-.539
10	.147	.137	-.358
11	.552	.686	.285
12	.666	.807	.124
13	.026	.108	-.118
14	.241	.467	.153
15	.306	.530	-.160
16	.035	.186	.011
17	.395	.625	-.061
18	.370	.599	-.106
19	.153	.053	-.388
20	.464	.681	.031
21	.211	.458	.030
22	.317	.539	-.163
23	.287	.530	-.079
24	.235	.455	-.166
25	.186	-.254	-.348
26	.324	.549	.153
27	.357	.450	-.392
28	.149	.197	-.333
29	.020	.142	-.009
30	.175	.285	.306
31	.053	.178	-.145
32	.018	.112	.072
33	.159	-.315	.244
34	.022	-.127	.077
35	.255	.317	.394
36	.279	.367	-.247
37	.305	.246	.485
38	.365	-.561	.222
39	.236	.164	.457
40	.412	-.585	.265
41	.463	-.248	.634
42	.296	-.450	.306
43	.560	.104	.741
44	.515	-.032	.717
45	.554	.233	.707
46	.653	.102	.802
	13.120	6.970	6.151

Results of a Factor Analysis of Structural Items Selected
for Use in Forming the Structural Subscales

<u>Variable</u>	<u>Communality</u>	<u>Factor 1</u>	<u>Factor 2</u>
1	.269	.491	.165
2	.579	.687	.327
3	.697	.820	.158
4	.231	.445	.180
5	.337	.554	-.174
6	.375	.612	.026
7	.454	.662	-.122
8	.494	.695	.100
9	.247	.496	.029
10	.297	.531	-.122
11	.321	.557	-.103
12	.210	.454	-.063
13	.316	.533	.178
14	.441	.483	-.355
15	.332	.275	.506
16	.331	.143	.557
17	.442	-.245	.618
18	.672	.034	.819
19	.515	-.089	.712
20	.631	.153	.780
21	.728	-.004	.853
	8.916	4.938	3.979
Percentage of Common Variance	100.000	55.378	44.622
Percentage of Total Variance	42.458	23.512	18.945

APPENDIX G

FACTOR ANALYSIS OF EFFECTIVENESS INSTRUMENT

Results of a Factor Analysis of the Effectiveness
Instrument Used in the Study: Varimax Rotated

<u>Variable</u>	<u>Communality</u>	<u>Factor 1</u>	<u>Factor 2</u>
1	.519	.373	.616
2	.797	.138	.882
3	.746	.297	.881
4	.434	.618	.228
5	.512	.677	.230
6	.706	.796	.270
7	.447	.625	.238
8	.405	.621	.139
9	.524	.691	.215
10	.699	.641	.536
	5.789	3.385	2.404
Percentage of Common Variance	100.000	58.476	41.524
Percentage of Total Variance	57.894	33.854	24.040

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